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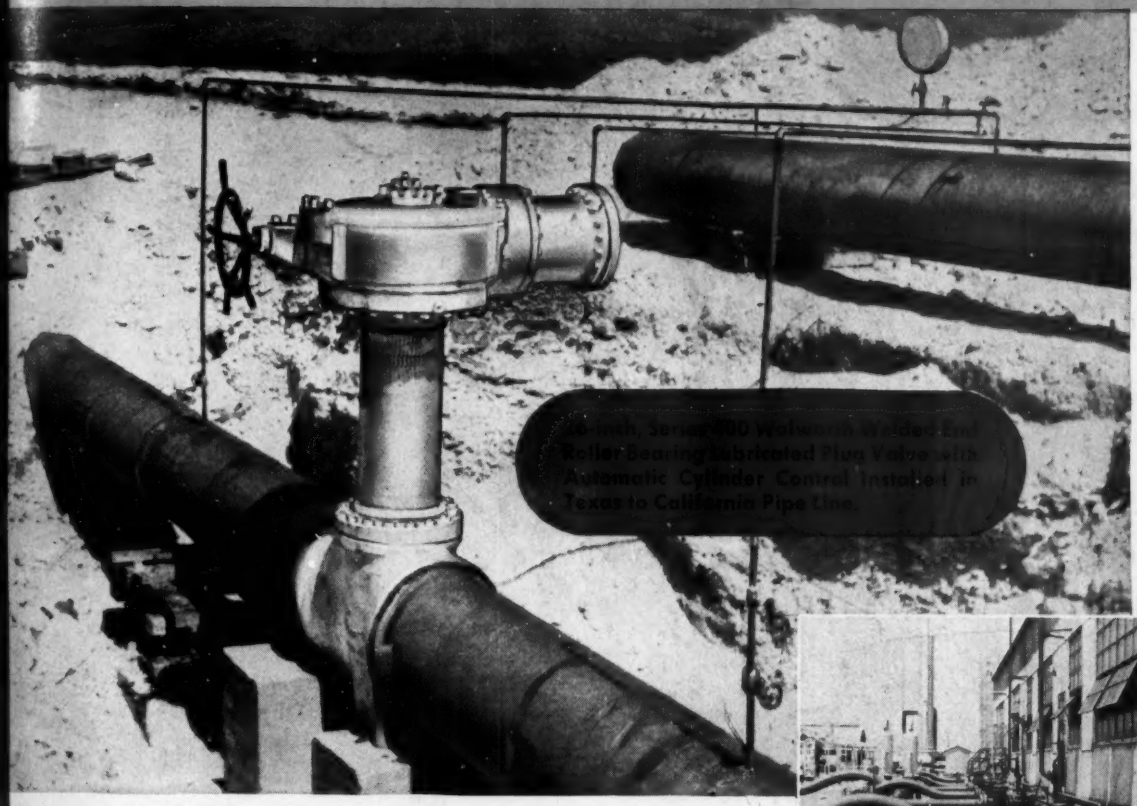

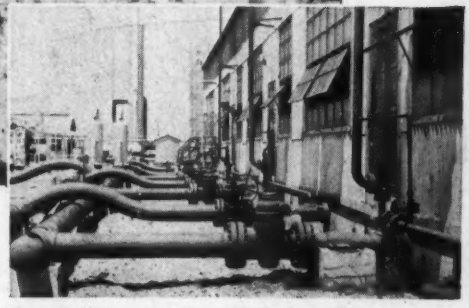

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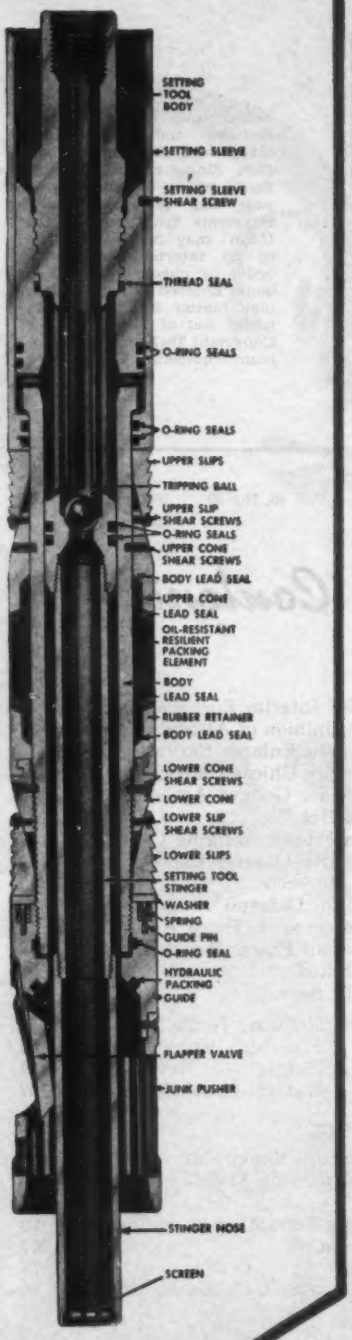

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A. P. I. Sessions

THE A.P.I. annual sessions last week presented a cross-section of the trends and the immediate and long range problems of the petroleum industry as another year nears a close. The production and refining group meetings reflected the steady progress in research and the practical operating arts which continue from year to year irrespective of conditions within the industry. The only restrictions on further expansion at this time are trained manpower and adequate facilities. Outstanding is the fact that higher prices for crude oil and products have widened the scope of what can be done economically in crude-oil recovery and refinery processing.

The shortage situation was discussed frankly. It was explained correctly that our troubles and those in prospect for next year result "not so much from undersupply as excessive demand." This year's output exceeds the war peaks by approximately 10 per cent despite the restrictions in obtaining new equipment, and this supply would more than have taken care of the normal expansion in demand. But demands for several products have not been normal because petroleum has been called upon to make up deficits of other suppliers of fuel and power.

Every effort will be made to prevent the threatened shortages for this winter and next summer. A balanced operating program was outlined at Chicago so that if shortages do develop in certain areas they will apply equally to all the principal products and to all customers.

The muddy waters of the international oil situation were cleared by those familiar with conditions outside this country. The great need for the new oil supplies of the Middle East is in the rehabilitation of Western Europe and in an improved standard of living for the Eastern Hemisphere generally. Petroleum aid to European countries on an enlarged basis is in prospect for the coming year and pending the completion of new operating facilities, the eastern world will continue to draw heavily on this hemisphere for its petroleum requirements.

There were developments at the Chicago meeting which reflect the fact that 1948 is a presidential year. Political panaceas are sure to be offered for any difficulties that arise in oil operations affecting voters. One does not need to be an alarmist to be concerned as to the prejudicial actions that might be taken in the coming regular session of the Congress.

Furthermore, there are situations which require an offensive rather than a defensive action. Reports to A.P.I. membership emphasized the fact that new legislation is the only answer to the Supreme Court decisions of recent months in the Interstate Gas and tidelands cases which extended federal control over the oil business more than all the actions of Congress have done over the past quarter century.

$597,000,000 Asked by Truman For Interim European Aid

by Bertram F. Linz

WASHINGTON.—The European aid program came officially before Congress this week with a request by President Truman for a $597,000,000 appropriation to tide Austria, France, and Italy over the next 4 months, approximately $36,000,000 of it representing the petroleum needs of those countries.

Consideration of the interim program will be in effect a dress rehearsal for the big show to follow, the 4-year program to put 16 non-Soviet European countries and western Germany on their feet by the end of 1951, the cost of which appears now to range between 12 and 22 billion dollars.

Even as Congress met, there were evidences that the oil phase of the long-range program, and possibly of the immediate aid plan as well, would be questioned by members from the consuming states, who would demand that the bulk of Europe's oil needs be supplied from other than United States resources.

Senate committees dealing with the stopgap aid program took steps November 18 to prevent further depletion of domestic oil supplies.

Before the Senate foreign relations committee, Undersecretary of State Robert A. Lovett accepted an amendment to the legislation proposed by Senator Lodge of Massachusetts, providing that wherever possible petroleum supplies for relief export shall be obtained from sources outside the United States.

At hearings to start late this week, Secretary of the Interior Krug will be asked about the effect of the aid program on the oil situation.

Chairman Styles Bridges said the committee does not intend to be "stampeded" into approving the program, and that the State Department has been asked for a complete detailed breakdown of the requirements of the three countries so that Congress may know exactly what is contemplated.

Expected opposition to the export of oil will be based on the difficulties the military are encountering in filling their needs, the imminent threat of shortages in this country, and the report of the Harriman Committee that it will be impossible to meet oil and oil-equipment requirements set up in the report of the Committee of European Economic Cooperation within the 4-year period.

At least 5, possibly 6, years will be required to fulfill the CEEC program, depending on the speed with which Middle East crude production and refining and transportation facilities can be expanded, the Harriman Committee concluded.

Downward Revision Called For

Taking the position that the domestic economy must not be shattered in order that Europe may revive, the Harriman report called for a downward revision of CEEC estimates. Many of the European production and plant expansion goals are "overly optimistic," it charged, and a more realistic evaluation of those possibilities will show also less need for oil than anticipated.

Exports from this country would not constitute a drain on our reserves, the committee felt, "because the domestic industry is producing all the petroleum which can be effectively recovered with present equipment and would not produce less if exports declined."

Four Major Recommendations

The four major recommendations of the committee were that (1) the European countries make a downward adjustment in their planned levels of petroleum imports and consumption; (2) U. S. companies should ship to Europe whatever supplies are available; (3) old Liberty and other tankers now laid up by the Maritime Commission be transferred to European countries since the bulk of the supply, most of which eventually will come from the Eastern Hemisphere, "will and should" be carried in foreign vessels, and (4) construction of new, large, fast tankers should be undertaken in American yards for American oil companies, both to ease our own tanker shortage and to strengthen our fleet for defense. In that respect the committee also called for continuation after March 1, next, of operation of Government-owned tankers under general agency agreements.

"At the present time world petroleum supplies are inadequate to meet world needs," the committee concluded, estimating that the shortage in filling CEEC requirements will be from 10 to 20 per cent in each of the 4 years of the program.

In like vein, the Harriman report held "unrealistically high" the estimate that Europe will produce $1,300,000,000 worth of oil equipment in the next 4 years, and pointed out that the $1,900,000,000 worth deemed necessary, nearly $600,000,000 of it to be provided by the U. S., plus the needs of this and other countries probably exceed world capacity to produce. It is "extremely unlikely" the United States can export as much equipment as is requested, it declared.

Interim Program

Discussing the interim program before House and Senate committees in charge of foreign affairs, Secretary of State George C. Marshall last week estimated that $1,000,000 will be required for oil for Austria, $22,000,000 for France and $13,000,000 for Italy.

This would not represent the total needs of those countries, Marshall explained, but Austria can supply about 50 per cent of her requirements from indigenous resources, and France will be able to finance $23,000,000 worth of oil and Italy $12,000,000 worth from other resources.

Senators on the Foreign Relations Committee dug into the subject of oil when Interior Department officials testified regarding the stop-gap program. Particularly anxious that domestic consumers be protected, they examined Edward B. Swanson, assistant chief of the Oil and Gas Division, closely about the source of the oil which is to be shipped abroad.

Most of that oil, Swanson said, will come from the Middle East, Venezuela and other areas outside the United States, but some of the approximately 4,000,000 bbl. which the three countries are to receive during the next 4 months will have to come from this country.

"It just isn't available elsewhere," he explained when Sen. Henry Cabot Lodge, Jr., of Massachusetts insisted that no domestic oil should be exported.

Lodge also explored two other points. Wanting to know if the U. S. would be reimbursed for the oil, Swanson said it would be desirable but was unlikely before the end of the long-range program. As to whether the aid program would raise domestic prices, Assistant Secretary William E. Warne said he hoped not, but admitted that short supply tends to raise prices.

On both sides of the Capitol committeemen raised the question of Russia. Senator Arthur H. Vandenburg of Michigan, chairman of the foreign relations committee, was critical of reports that lend-lease shipments are still being made to the Soviet, which he declared was contrary to a Congressional mandate, and Rep. Donald M. Jackson of California, member of the House foreign affairs committee, demanded that Secretary of Commerce Harriman submit data on commodities now being exported to Russia.

All Tanker Sales Halted Pending Opinion of Attorney General

WASHINGTON.—All sales of Government-owned tankers, to both domestic and foreign buyers, have been halted pending an opinion by the Attorney General on the legality of the administration's program to sell 100 of the vessels foreign while applications from U. S. citizens are pending, it was disclosed last week at the resumption of hearings by the Senate Small Business Subcommittee.

The request for an opinion, it developed, was made by the White House at the instigation of the Maritime Commission after Sen. Kenneth S. Wherry of Nebraska, chairman of the subcommittee, elicited from Maritime Commissioner Granville Mellen an opinion that the program was in conflict with specific restrictions in the Ship Sales Act of 1946.

With Secretary of National Defense James Forrestal and Secretary of the Navy John L. Sullivan as witnesses, Wherry on Friday probed deeper into the chronology of the discussions between the Maritime Commission and the Navy regarding the desirability of the sale from the standpoint of national defense.

Both officials agreed that the national security would be best served by keeping all the tankers under the American flag, but declared that when the decision to sell abroad was made last June there were virtually no citizen applications for the vessels in spite of extensive efforts of the commission to persuade American companies to purchase.

Forrestal Agreed to Program

Eventually, Forrestal disclosed, he agreed to the program, provided that not more than 54 tankers should be sold from the active fleet until replacements from the inactive fleet were readied for service; that in no event the active fleet should be reduced "below United States needs," and that the best ships be retained under U. S. control.

In addition, he said, he requested the commission to join the Navy Department in preparing legislation for submission to Congress for the earmarking of the proceeds of the sale of tankers, to be used for the construction of new tankers.

Forrestal and Sullivan disclaimed all responsibility for the actions of the Maritime Commission, pointing out that the law provides only that the commission shall "consult" the Secretary of the Navy before final action is taken. After such "consultation," they said, the commission is free to do as it sees fit and, while it did finally accept the provisos urged by the department, there was no way the Navy could have forced their acceptance.

Under questioning by Wherry, the two officials said they did not know how many, if any, of the tankers had been "definitely committed," but agreed that if they had an opportunity, as a result of the attorney general's opinion, they would "review" the situation in the light of present conditions. They refused a promise sought by Wherry, however, that if the attorney general furnishes a loophole they would cut off all sales foreign, pointing out there might be moral if not financial commitments.

American Ownership Desirable

From the security standpoint, Sullivan admitted under prodding from the senator, "it would be very desirable if American companies would buy these tankers and operate them on those runs that would bring in oil from foreign countries and supply the needs of Europe. No one deplored more than I the refusal of American companies to purchase these tankers a year ago and operate them under the American flag."

Explaining Forrestal's suggestion that the proceeds from tanker sales be used to build new vessels, Sullivan declared it would keep alive the domestic shipbuilding industry and the various industries which supplied it. To permit the industry to die, he declared, would be "very short-sighted policy."

Forrestal defended the sale to foreign countries so that they might secure oil from the Middle East, and incidentally the building of the trans-Arabian pipe line, on the ground that such oil would lessen the drain on our own resources.

"From a military point of view," he told Wherry, "there is nothing more serious to the near and long-term security of this country than the availability of oil in the Middle East."

Both officials also were vehement in their support of a strong domestic industry. Under questioning by Sen. Edward H. Moore of Oklahoma, sitting in as representative of the Senate judiciary committee, Sullivan declared the Navy's idea of an ideal situation was one in which all the oil needed would be available from the Western Hemisphere and preferably from the United States.

Sullivan denied, when asked by Moore, that he advocated bottling up the development and production of oil in this country. "Certainly not," he declared, "and one of the tragedies in the situation in which we find ourselves is that there haven't been more discoveries in this country."

Wherry will go deeper into the situation this week, seeking testimony from John L. Steelman, assistant to the President; Capt. Granville Conway, coordinator of the emergency export program, and other high officials, regarding the development of the decision to sell 100 tankers foreign after originally planning to sell only 35.

It was also indicated that Wherry believes the subject is getting too big for the Small Business Committee and may turn it over to the Judiciary and Interstate and Foreign Commerce Committees, both of which, together with the House Merchant Marine Committee, were invited to send representatives to his hearings.

After completing this phase of his investigation, Wherry announced, he will hold a hearing November 24 at which representatives of the oil companies will testify regarding the shortage of oil on the East Coast. A number of letters have been received from the industry, including large companies, on the subject, particularly with respect to the lack of tankers.

Two Weekend Developments

"If there is a shortage of tankers," he said, "there is no excuse for selling United States tankers outside of the United States' jurisdiction at this time. And, it follows, if the tankers are properly retained for United States service to supplement tankers already carrying domestic and Middle East oil, there is no urgency for building a 3-year pipe-line project across Saudi Arabia, as long as steel is essentially short."

There were two weekend developments in the tanker situation. One was the release by the White House of a report of the President's advisory committee on the merchant marine, recommending a $600,000,000 shipbuilding program, which would include a number of tankers, to keep the nation's fleet from becoming obsolete. Actual cost of the construction program would be about double this amount, which would be used to encourage ship construction by subsidies of 50 per cent of the cost.

The other development was the renewed demand by Chairman Alvin F. Weichel of the House merchant marine committee that the United States seize vessels lend-leased to Russia during the war, including the several tankers which loaded oil on the West Coast last summer, arousing agitation which led to the imposition of oil export controls.

HENRY D. RALPH | DAHL M. DUFF | BERTRAM F. LINZ | JOHN C. CASPER

Journal Editorial-Staff Changes Will Expand Services to Readers

IN order to carry out The Oil and Gas Journal's editorial program for the coming year, changes and additions are being made in the editorial staff, involving the Tulsa, Houston, and Washington offices.

Effective immediately, Henry D. Ralph, who has been in charge of the Washington office of the Journal since 1936, becomes news editor with headquarters in Tulsa. Ralph is one of the most widely known Washington correspondents. Previous to joining the Journal staff he was engaged in newspaper and trade-journal work and was for a time Washington representative of the United Press. He has been active in the National Press Club at Washington and has served as secretary and treasurer of that organization over the past year. His writings on oil developments from Washington, including the war period, have been widely commended

Ralph has been succeeded at Washington by Bertram F. Linz, who has been engaged in writing since 1913. He has served as a trade-journal representative in Washington for many years and has made a special study of oil activities over the past 20 years. Linz' headquarters in Washington will be 621 Albee Building.

Reflecting the ever-increasing importance of oil operations in the Gulf Coast and adjoining areas, Dahl M. Duff, associate editor, is being transferred from Tulsa to the Houston office of the Journal. Duff joined the editorial staff of the Journal in January 1946 following his discharge from the Army as a lieutenant colonel in the artillery. His 5 years with the Army included service in both the European and Pacific areas. Previous to the war Duff graduated from University of Oklahoma and was engaged in writing. He will devote his time to operating and news developments. This arrangement will enable Ed Short of the Journal's Houston office to devote his full time to reports on engineering practices. Essie Mae Abbott is the editorial assistant in the Houston office.

Effective December 1, John C. Casper will join the editorial staff of the Journal at Tulsa as statistician and economist. For the past year and half Casper has been connected with the petroleum economics division of the Bureau of Mines at Washington. During the war from 1943 to 1946 Casper was on leave from Sinclair Refining Co. as a member of the staff of Petroleum Administration for War. He served as chief of the water-transport section and also acting chief of the statistical and analysis section, research division, of PAW. Previous to the war for several years Casper was connected with the market-analysis department of the Sinclair company. He is a graduate of Wake Forest College and has done graduate work in science and economics at North Carolina, George Washington, and New York universities.

Gain of 100,000,000 Bbl. in Demand Seen in 1948

WASHINGTON.—A new forecast of supply and demand in 1948, drawn up by the Bureau of Mines, places total demand for the year at 2,242,100,000 bbl. and domestic production at 2,075,300,000 bbl., of which 1,936,200,000 will be crude and 139,100,000 other oils.

The bureau placed 1948 total demand at 101,500,000 bbl. more than the expected demand this year, while production is seen as increasing by only 95,000,000 bbl., which will be slightly less than the estimated domestic demand of 2,085,000,000 bbl.

Imports next year are calculated at 166,800,000 bbl. compared with an anticipated 157,000,000 this year, but the forecast shows sharply curtailed exports at 149,000,000 bbl. compared with 163,000,000 in 1947. The cut in exports will come in products.

The bureau explained its forecast is based on the probable supply of products as determined by "available refinery capacity and the limits of existing transportation facilities."

Kane-to-Butler Area Gets 13-Cent Crude Increase

A price increase of 13 cents for crude produced in the Kane-to-Butler area was announced early this week, bringing the price differential of the Pennsylvania Grade crude produced in the Middle District up to the same level as the Allegany and Bradford fields.

Increased postings were made by Cities Service Oil Co., Titusville, Pa.; Quaker State Oil Refining Corp. and The Pennzoil Co., both of Oil City, Pa.; United Refining Co., Warren, Pa.; Valvoline Pipe Lines, Butler, Pa.; and Pennsylvania Refining Co., Titusville and Karns City, Pa.

This price increase follows the recent move of Brundred Oil Corp., Oil City, Pa., which recently increased their price for Middle District crude oil from $4.37 to $4.50.

Other grades of Pennsylvania Grade crude were not affected, but there was considerable speculation as to the effect this increase would have on oil produced outside the Kane-to-Butler area.

The last price increase in Pennsylvania Grade oil came on September 1, when all grades were increased 20 cents per barrel.

this week

GOVERNMENT—President Truman asks Congress for $597,000,000 for Austria, France, and Italy during next 4 months. . . . About $36,000,000 represents petroleum needs. . . . ¶All tanker sales, including domestic, halted pending an opinion by the attorney general on legality of foreign sales. . . . ¶Investigation into Arabian American Oil Co. activities held up as Department of Justice is asked to determine whether antitrust violations exist in foreign cooperation among companies which are domestic competitors. . . .

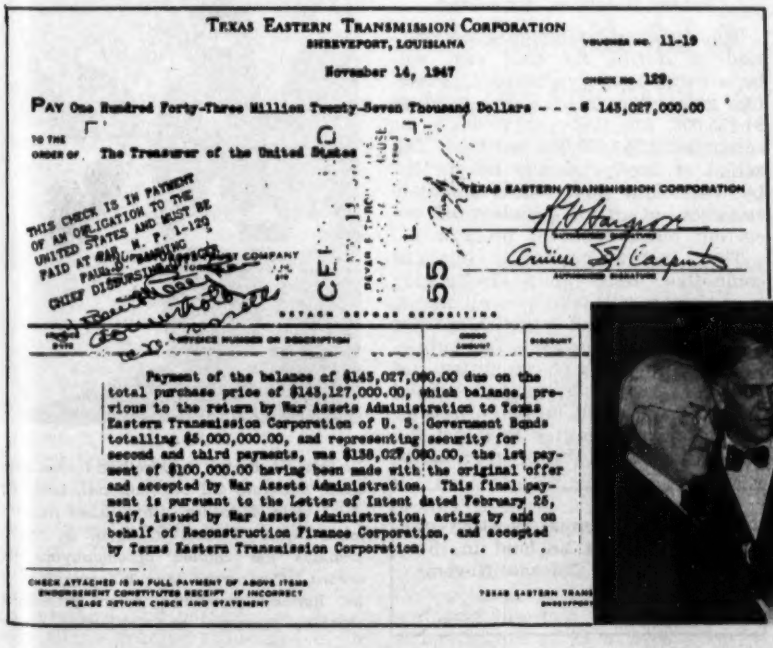
INTERNATIONAL—Excise taxes on imports of unfinished oils and other petroleum commodities cut in half under reciprocal trade agreement just announced by State Department. . . . ¶Large increase in French refining capacity predicted. . . . New construction planned. . . . ¶Joseph E. Pogue forecasts world oil demand totaling 11.8 million barrels daily by 1956. . . . Increase of 37 per cent in demand in United States and 76 per cent in rest of the world is predicted. . . .

LEASES—Louisiana mineral lease sale brings cash bonuses of $249,154 on 24,123 acres. . . . All tracts are inland. . . . ¶Texas School Land Board plans trip to inspect acreage on which proposed mineral leases are under protest. . . . Protests allege submerged lands offered in sale have become dry land and belong to owners of adjacent property. . . .

PIPE LINE—"Biggest Inch" opened officially near Los Angeles in ceremonies marking turning into California distribution systems of some 175,000,000 cu. ft. of Texas and New Mexico gas daily. . . . 1,200-mile line to be extended to Dumas, Tex., next year and throughput increased to 305,000,000 cu. ft. . . . ¶Sinclair Refining Co. awards contract for 270-mile products line from Houston to point near Fort Worth. . . . ¶Phillips Petroleum Co. awards contract for 104 miles of 8-in. looping. . . . ¶Cities Service Gas Co. get FPC approval on expansion plans to increase gas supply. . . .

REFINING—Ashland Oil & Refining Co. buys Government-owned refinery near Catlettsburg, Ky., from WAA for $2,150,000. . . . ¶Pan American Petroleum & Transport Co. takes option on third interest in Root Petroleum Co. . . . ¶Crown Central Petroleum Corp. buys from WAA 100-octane gasoline plant for $2,300,000. . . . ¶B. F. Goodrich Co. president asks limit on production of synthetic rubber. . . . Commerce Department reveals consumption of synthetics exceeded domestic production during September by 11,259 tons. . . . Natural rubber consumption exceeded imports, and total consumption, natural and synthetic, showed a 7 per cent increase over April. . . .

TRENDS—Crude-oil production for week ended November 15 averages 5,303,045 bbl. daily, an increase of 10,655 over the previous week and only 15,370 bbl. below the all-time record set in the week ended October 25. . . . Well completions during week ended November 15 total 705, a drop of 60 from previous week. . . . Wildcats total only 100, down 27 from previous week. . . . Runs to stills average 5,189,000 bbl. daily during week ended November 1, a drop of 35,000 bbl. from previous week. . . .



TEXAS EASTERN TRANSMISSION CORPORATION
SHREVEPORT, LOUISIANA

November 14, 1947

PAY One Hundred Forty-Three Million Twenty-Seven Thousand Dollars - - - $ 143,027,000.00

TO THE ORDER OF The Treasurer of the United States

THIS CHECK IS IN PAYMENT OF AN OBLIGATION TO THE UNITED STATES AND MUST BE PAID AT PAR. U. S. P. 1-129

TEXAS EASTERN TRANSMISSION CORPORATION

Payment of the balance of $143,027,000.00 due on the total purchase price of $143,127,000.00, which balance, previous to the return by War Assets Administration to Texas Eastern Transmission Corporation of U. S. Government Bonds totalling $5,000,000.00, and representing security for second and third payments, was $138,027,000.00, the 1st payment of $100,000.00 having been made with the original offer and accepted by War Assets Administration. This final payment is pursuant to the Letter of Intent dated February 25, 1947, issued by War Assets Administration, acting by and on behalf of Reconstruction Finance Corporation, and accepted by Texas Eastern Transmission Corporation. . . . .

CHECK ATTACHED IS IN FULL PAYMENT OF ABOVE ITEMS
ENDORSEMENT CONSTITUTES RECEIPT IF INCORRECT
PLEASE RETURN CHECK AND STATEMENT

A $143,027,000 check, representing payment in full by Texas Eastern Transmission Co. for the Big Inch system, is presented by Harvey D. Gibson, below left, president of Manufacturers Trust Co. of New York, to Robert M. Littlejohn, director of War Assets Administration. Looking on are George R. Brown, second from left, chairman of the board of Texas Eastern, and R. H. Hargrove, Shreveport, president. Closeup of the check is shown at left

Heaviest Agenda in A.P.I. History Covered in Chicago Meeting

by Charles J. Deegan

CHICAGO.—The twenty-seventh annual American Petroleum Institute meeting ended after covering the heaviest agenda in the Institute's history and considering some of the most serious and complex problems that have ever faced the industry in peacetime. These factors resulted in a final registration, with all duplications eliminated, of 4,564, a total which smashed all past records by a wide margin, and exceeded optimistic forecasts by 14 per cent.

To carry on the work during the coming year, which is expected to be very heavy, William R. Boyd, Jr., was reelected president; B. L. Majewski, Deep Rock Oil Corp., was reelected vice president for marketing; Dr. Robert E. Wilson, Standard Oil Co. (Ind.), was reelected vice president for refining; Jake L. Hamon, Cox & Hamon, Inc., was reelected vice president for production; L. S. Wescoat, Pure Oil Co., was reelected treasurer, and Lacey Walker was reelected secretary and assistant treasurer.

W. Alton Jones, Cities Service Co., was elected vice president for transportation, succeeding B. Brewster Jennings, Socony-Vacuum Oil Co., Inc., who had served the limit of two terms in that office.

W. Alton Jones, president, Cities Service Co., who was elected vice president for transportation at last week's meeting of the A.P.I., succeeding B. Brewster Jennings, president, Socony-Vacuum Oil Co., Inc.

The Journal's A.P.I. issue of November 15 was devoted to the meeting in Chicago last week. Additional reports in this issue are published on pages 58 and 59, and pages 68-74.

Six new members were elected to the board of directors: W. M. Bovaird, Bovaird Supply Co., Tulsa; Reid Brazell, Leonard Refineries, Alma, Mich.; Ralph Neuhaus, Hughes Tool Co., Houston; Sid W. Richardson, independent producer, Fort Worth; E. L. Shea, Ethyl Corp., New York; and W. W. Vandaveer, Allied Oil Co., Cleveland.

Some consideration was given to a midyear meeting of the Institute in 1948, but the final decision was that it was not necessary. The Refining Division will hold a midyear meeting in Philadelphia; the Marketing Division will continue to hold quarterly meetings; the Production Division will continue its regional meetings. No intervening meetings are now planned by the Transportation Division, but authority exists to make such a meeting possible, if desired, by going through routine Institute channels.

Public Relations Expanded

The public-relations program carried on during the past year will be expanded, as the Board of Directors gave approval to a plan to raise $1,855,000 for this year's work, as compared to $1,000,000 last year. The action of the board was interpreted by President Boyd as a complete endorsement of the conduct of the current public-relations program.

The Institute's public-relations committee, under John M. Lovejoy as chairman, will take over-all charge of the program and establish policies for its operation in 1948. The public-relations operating committee, of which Franklyn Waltman is chairman, probably will be authorized by the Lovejoy committee to direct the administration of the program. Robert H. Colley, chairman of a finance committee, stated that his group would meet shortly to outline specific steps in raising the fund, and that all companies, small and large, would be invited to contribute.

The program will continue to be administered and managed by the Fred Eldean Organization, Inc. The advertising agency for the program is Sullivan, Stauffer, Colwell & Bayles, Inc.

A proposal was submitted to the board of directors to provide for a high-salaried director, who also would run the public-relations program and coordinate all the public relations and information activities of the Institute. After considerable discussion, the matter was referred to a five-man committee with power to take action.

The 1948 annual meeting of the A.P.I. will be held in the Stevens Hotel, Chicago, November 8-11.

Tidelands Action Sought

Prompt passage by Congress of legislation making it plain that authority of the Federal Power Commission under the Natural Gas Act does not include the right to regulate production or gathering of natural gas was urged in a resolution adopted by the board of directors.

While no formal action was taken on the question of federal Government title to tidelands, a progress report was submitted by the Tidelands Study Committee, under the chairmanship of Hines H. Baker, executive vice president of the Humble Oil & Refining Co. Other members of this study committee are A. C. Mattei, vice chairman; W. H. Ferguson, Edward N. Freeman, Walter S. Hallanan, B. A. Hardey, Wiley L. Moore, S. B. Mosher, John G.

(Continued on page 122)

Dr. Wm. M. Burton (left), retired former president, Standard Oil Co. (Indiana), holds the A.P.I. Gold Medal for Distinguished Achievement, while William R. Boyd, Jr. (right), displays the citation accompanying the award. The award was in recognition of Dr. Burton's pioneering work in refining cracking processes and laboratory control

Duties on Unfinished Oils Cut Under Geneva Trade Agreement

WASHINGTON. — The present excise taxes on imports of gasoline, naphtha, paraffin and paraffin wax, and unfinished oils are cut in half by the new reciprocal trade agreement with 22 countries, which was made public this week by the State Department.

No cuts are made in the duties on crude oil or petroleum products not enumerated. The reduced import taxes will apply to the products of all the signatory nations, and will become effective January 1, 1948, as to some countries. The agreements were negotiated at Geneva during the summer and fall.

Prior to the war, the bulk of imports of the concession items, which had a value of $5,708,000 in 1939, came from the Netherlands West Indies, it was explained. The 1946 imports amounted to only $68,000, about three-fourths of the total coming from Canada, but in the first 8 months of this year receipts of naphtha, paraffin and unfinished oils increased to $832,000, which included $450,000 worth of naphtha, mostly from Mexico, and $365,000 of unfinished oils, nearly all from Canada.

In return for the concessions granted by this country, the various participants in the agreement granted reductions in their duties on petroleum products, well-drilling machinery and other equipment.

Schedule of Reductions

The United Kingdom bound a 10 per cent rate on paraffin wax and petroleum jelly; France bound duty free crude entering for controlled refineries and granted moderate reductions in duties on gasoline and lubricating oil, from 24 to 18 per cent. Southern Rhodesia and the Union of South Africa bound their duties on lubricating oil; India granted small reductions on asphalt, mineral grease and some mineral oils, and Czechoslovakia took similar action on paraffin, petroleum jelly and certain mineral oils. Benelux (Belgium, Netherlands and Luxemburg, which have consummated a customs union) bound duty free paraffin and petrolatum.

Lebanon bound lubricating oils at the existing rate; Brazil granted a 30 per cent reduction on petroleum oil for electrical apparatus and held the duty on mineral grease below 10 per cent, and Chile cut the duty on lubricating oil in large containers by 40 per cent, certain lubricating grease by one-third, and paraffin by 50 per cent. China granted reductions of 16 to 20 per cent on lubricating oil and grease and bound the duty on asphalt.

The United States cut synthetic rubber from 20 to 10 per cent but reserved the right to withdraw the concession if necessary to safeguard our synthetic rubber program.

General provisions of the agreement call for unconditional general acceptance of the most-favored-nation clause to protect the concessions which are made, provides for nondiscrimination in tariff and customs matters, and safeguards against the impairment of the concessions by devices such as quotas, protective excise taxes or others.

Covered by the agreement are Australia, Benelux, Brazil, Burma, Canada, Ceylon, Chile, China, Cuba, Czechoslovakia, France, India, and Pakistan, New Zealand, Norway, Southern Rhodesia, Lebanon - Syria, Union of South Africa, United Kingdom, Newfoundland and dependent territories of the United Kingdom, which collectively with the United States accounted for approximately three-quarters of the 1938 international trade of the world. It will go into effect in Australia, Benelux, Canada, France, and the United Kingdom on January 1, next, and in other countries as soon thereafter as procedures permit but not later than next June 30.

Texas Allowable Set at 2,540,102 Bbl. Daily

AUSTIN.—A net allowable of 2,540,102 bbl. daily, a drop of 10,107 bbl. from November, has been set for December by the Texas Railroad Commission.

With an estimated underproduction of 203,208 bbl., the net allowable is designed to produce 2,336,894 bbl. of oil daily in December. The figure still is above the Bureau of Mines forecast of demand in December of 2,300,000 bbl. daily, unchanged from November.

No changes were made in existing orders except in East Texas, where the retention of the present 20-day producing schedule will account for the reduced output in the 31-day month.

East Texas Salt Water Disposal Co.'s petition for a commission order requiring injection of 85 bbl. of salt water instead of 75 to earn a barrel of bonus oil was adopted unanimously by the commission. The change was made possible, the company said, by recent price increases.

Total Texas production for December, including distillate and natural gasoline, was set at 2,538,534 bbl. by the commission.

The next statewide proration hearing will be held in Austin December 18, Col. E. O. Thompson, commission chairman, said.

Teater Properties Sold For $1,000,000 Cash

SAGINAW, Mich.—In a $1,000,000 cash deal, Charles W. Teater has completed arrangements for the sale of most of his crude-oil production properties to Roosevelt Oil Co. and Gordon Oil Co., Mt. Pleasant.

The deal involves 53 wells in 8 Michigan counties having a total daily production of about 1,000 bbl. Gordon Oil Co. will operate the leases and the Roosevelt firm's refinery will be the receiving agency.

Teater retains his drilling equipment, gas production properties and his interest in 30,000 acres of leased lands scattered through the state. He is president of the Michigan Oil & Gas Association, a director of the Independent Petroleum Association, and a member of the Michigan Oil Advisory Board. In 1933 he brought in the 3,200-bbl. gusher that opened Midland County's Porter field, one of the state's most prolific pools.

Company Contracts to Buy Crude at 20-Cent Premium

Eastern States Petroleum Co. of Houston has agreed in a 2-year contract to purchase the crude and distillate production at a premium of 20 cents per barrel over the posted price and 5 cents per barrel gathering tariff. The contract was made to purchase the oil from the jointly owned properties of American Liberty Oil Co. and T. P. Cannon in the Henderson field, Rusk County.

Louisiana Gets First Offshore Oil Producer

NEW ORLEANS. — The first producing oil well on an offshore Gulf of Mexico tract leased from Louisiana has been reported completed by Kerr-McGee Oil Industries, Inc., Oklahoma City. The well is 12 miles off the nearest land, Point au Fer Island, Terrebonne Parish. Tom Seale, chief engineer for the company, said the well had been flowing continuously at a rate of 30 to 40 bbl. per hour.

Flow is from above a shallow salt dome. Perforations are in a 16-ft. oil sand section at 1,734-60 ft. Preliminary tests showed the gravity of the oil to be about 23.6°. The test was spudded September 9.

International

WORLD-WIDE OIL DEVELOPMENTS

Substantial Increase Expected in French Refining Capacity

REFINERY capacity in the north of France is expected to be substantially increased by a decision of the French authorities whereby all rights to import crude oil are being transferred from the Raffinerie de Petroleo du Nord to the Societe Generale des Huiles de Petroles. The transfer was made in order to cut transportation costs.

Furthermore, the Societe Generale plans to construct a refinery at Dunkirk with an annual capacity of 1,000,000 tons (approximately 21,000 bbl. daily). The Courchelette refinery, owned by the same company, intends to concentrate on the process of lubricating oils. Other finished petroleum product output will be divided between the refineries of Societe Generale and Raffinerie de Petrole du Nord.

Commenting on this arrangement, a Reuters dispatch from Paris quotes oil officials as stating that it will go a long way toward assuring France "of sterling crude oil" in view of the ties between Societe Generale and Anglo-Iranian Oil Co., Ltd.

Raffinerie de Petrole du Nord had a refinery at Dunkirk, before the war, with an annual capacity of 500,000 tons (approximately 10,000 bbl. daily). Anglo-Iranian has a refinery at Courchelette, near Douai, with a rated throughput of 250,000 tons annually (approximately 5,500 bbl. daily). This refinery is managed by Societe Generale des Huiles de Petrole.

The merger between the Raffinerie de Berre and S.A. des Petroleum Jupiter (Royal Dutch-Shell), authorized by the French Ministry of Commerce and Industry in October, reportedly is another step in increasing French refinery capacity. The new company, Cie. de Raffinage Shell Berre, presumably will have a refinery throughput equal to about 20 per cent of all the refining capacity of France. Cie. de Raffinage plans to increase the throughput of the Raffinerie de Berre's refineries and to construct a modern refinery somewhere on the Mediterranean coast with an estimated annual capacity of 1,500,000 tons (approximately 31,000 bbl. daily).

Meanwhile, reports from Paris indicate that the French Government has decided to authorize additional dollar credits for the importation of dollar petroleum products.

France imported 469,327 metric tons of crude oil in September, compared with 484,445 tons in August. Venezuela supplied 162,852 tons; the United States, 76,673 tons; West Asiatic countries, 61,515 tons; and Iran, 70,951 tons. (A metric ton is equivalent to about 7.7 bbl.)

Fuel-oil imports in September dropped substantially, amounting to 28,152 metric tons, against 40,572 tons in August. The West Indies headed the list of suppliers with 12,013 tons, followed by Venezuela with 11,076 tons; the U. S. with 2,328 tons; Germany with 1,392 tons; and the United Kingdom with 1,138 tons.

Gasoline imports in France dropped in September to 46,494 metric tons compared with 54,597 tons in August. Over 50 per cent of this gasoline came from the U. S., and the amount supplied, 28,486 tons, was about 8,000 tons higher than the August figure. Other chief sources of supply were: the West Indies, 7,400 tons; West Asiatic countries, 3,836 tons; and Venezuela, 3,321 tons.

The U. S. remained France's chief supplier of lubricating oils, having sent 9,159 metric tons in September, out of total imports of 9,371 tons.

Gas-oil imports increased slightly in September, totaling 7,698 tons, compared with 7,160 tons in August. Imports were from the U. S., with 4,300 tons; Saudi Arabia, 896 tons; and West Asiatic countries, 799 tons.

U.K. to Get Greatest Share Fourth Quarter Exports

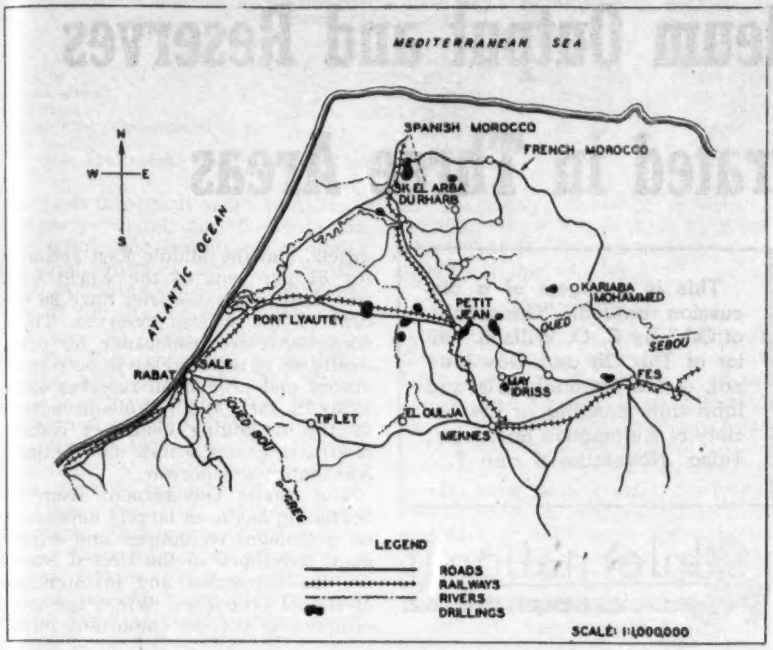
WITH a total of 4,540,000 bbl. of petroleum products to be exported to the United Kingdom from the United States in the fourth quarter of this year, the U.K. will get the largest percentage of the total U.S. petroleum product exports which will amount to 12,000,000 bbl.

All oil exports to the Soviet Union have been prohibited as Russia refused to give the U.S. Government details about her own petroleum supply situation and how U.S. petroleum product exports would be used within the Soviet Union.

Export allocations for the fourth quarter of 1947, as announced November 12 by the Office of International Trade may be found in the accompanying table.

FOURTH QUARTER ALLOCATIONS (BBL.)

	Aviation gasoline	Motor gasoline	Kerosine	Gas oil and distillate oil	Residual fuel oil
Argentina	.....	240,000	.....	.....	.....
Australia	.....	220,000	20,000	85,000	.....
Belgium	12,000	110,000	.....	8,417	8,000
Brazil	3,000	100,000	1,000	5,000	.....
China	40,000	300,000	200,000	64,550	106,000
Cuba	20,000	220,000	.....	16,000	56,000
Denmark	.....	68,000	6,200	150,000	100,000
Finland	.....	200,000	.....	65,000	200,000
France	120,000	.....	150,000	100,000	110,000
Italy	40,000	.....	.....	.....	.....
Mexico	90,000	300,000	15,000	15,000	250,000
New Zealand	.....	221,000	2,000	92,000	.....
Norway	.....	70,000	.....	.....	.....
Sweden	.....	242,500	100,000	310,000	150,000
United Kingdom	120,000	2,000,000	120,000	1,800,000	500,000
South Africa	.....	2,750	.....	1,338	.....
Netherlands	.....	.....	1,280	80,000	.....
Other countries	95,000	750,000	200,000	150,000	400,000
Undistributed reserve	60,000	355,750	184,540	57,695	120,000
Total	600,000	5,400,000	1,000,000	3,000,000	2,000,000



Map of French Morocco showing new field and current drilling activity

New Oil Field Found In French Morocco

A NEW oil field in the area of Petit Jean, French Morocco, has been discovered by Societe Cherifiene des Petroles. The discovery well showed a daily production of 20 cu. m. (approximately 126 bbl.), according to a Reuters dispatch from Paris.

F. L. Lassauze, director of Societe Cherifiene, told The Oil and Gas Journal last year that exploration work would be continued in French Morocco. Among areas to be developed are the Soukeb-Arba field as well as Tsellfat, Bou Draa and Bou Draa Nord. Annual production in Morocco is now less than 23,000 bbl., with this coming from Bou Draa, Tsellfat and Ain Hamra. This output is consumed locally.

While in the United States, Lassauze arranged for the purchase of five drilling rigs with which to step up Morocco's wildcatting and development program. Petit Jean is near Arbaco, a Moroccan village.

Other reports from North Africa indicate that gasoline coupons have been cut to half the face value due to a shortage of foreign exchange and transportation difficulties.

Ninth Spring Hill Well Flows 600 Bbl. Daily

Well No. 9 of the Spring Hill oil field in Chile was reported to have flowed an estimated daily production of approximately 600 to 700 bbl. at a depth of 6,900 ft. Government experts said the commercial possibilities of the field on the southern shore of Magellan Straits, had now been proved beyond doubt.

Soviet Refuses to Discuss Oil Exports from Austria

Reluctance of Soviet Russia even to discuss Austria's over-all oil situation has been highlighted again by the fact that Russia's Col. Gen. L. U. Kurawov, Soviet's representative on the Austrian Allied Council, refused to comment on reports that Russians in Austria have been shipping petroleum products for the use of the Russian Black Sea fleet.

The governments of Hungary and Romania reportedly have been demanding that Austria pay the full freight rates on these oil shipments, and pay in Swiss francs. The Russian declined to discuss this matter with his colleagues on the council, stating that Moscow had offered to take care of such costs.

Prior to this, Lt. Gen. Geoffrey Keyes, United States representative on the Allied Council, stated that it was a scandal that Austria had to spend dollars importing oil from the west when her own oil was being exported, contrary to all agreements Russia had signed, including the control agreement.

In addition to the petroleum products which pass through Romania to Russia, and through Romania and Hungary to Russia's Black Sea fleet, considerable quantities reportedly find their way to the Austrian black market. Current crude-oil production in Austria is between 60,000 and 70,000 tons monthly, or about 16,600 bbl. daily.

Pogue Sees Huge Gain In World Oil Demand

WORLD demand for oil will increase 50 per cent during the next decade, reaching 11.8 million barrels a day by 1956, or thereabouts, Joseph E. Pogue, vice president of Chase National Bank, declared in an address November 17 before the Detroit Economic Club.

"Oil consumption in the United States will increase from 4.9 million barrels per day in 1946 to 6.7 million barrels per day in 1956, an expansion of 37 per cent," he said. During the same period, consumption in the rest of the world is estimated to show a growth of 76 per cent, from 2.9 million to 5.1 million barrels a day. The figures, he added, are based upon the assumption that reconstruction of Europe and Asia will take place.

Describing the area adjacent the Persian Gulf as "little understood," Pogue said the oil produced there may be expected gradually to relieve the Eastern Hemisphere of dependence upon the oil of the United States and the Caribbean.

"Far from being an object of American imperialism, this oil is not primarily required in the United States and no large quantities of it in the foreseeable future need come here," he declared.

"It is perhaps not too much to say," he continued, "that a million barrels of oil per day delivered to the shores of the Eastern Mediterranean, which is the expectation by 1951-52, will do more to create a lasting industrial recovery in Europe and to promote peace than the sum total of the political efforts to date."

Pointing out that the oil industry is faced with enormous capital requirements both here and abroad and by rising costs of many kinds, Pogue asserted that present prices and profit levels, "far from being exorbitant or nonsocial, are necessary to bring about the future growth that society needs and, therefore, in the long run are in the public interest."

"Nothing could be more harmful," he said, "than artificially to regulate prices and profits at this juncture. They are functional, that is, they have an economic job to do, a job that can be done in no other way."

World Petroleum Output and Reserves Concentrated in Three Areas

This is a digest of a discussion entitled, "Geography of Oil," by C. O. Willson, editor of The Oil and Gas Journal, at the national fuels and lubricants meeting of the Society of Automotive Engineers, Tulsa, November 6 and 7.

THIS discussion deals with one of the earth's most essential minerals—petroleum—its global distribution and its significance in the present-day trends of our civilization.

The present global output is 53 per cent greater than in 1938, the last full calendar year of operations before the start of World War II. Thus despite the fact that important oil areas have yet to recover from the destruction of the war we now have a petroleum industry which is half again as large as it was less than a decade ago.

The oil-bearing areas have a proven reserve estimated at 67,700,000,000 bbl. While in volume the petroleum reserves in this country have about doubled since 1935 those outside the United States have tripled.

For the purpose of this discussion Table 1 summarizes conditions in regard to current crude-oil output and proven reserves and reflects conditions which are controlling in today's petroleum geography and will continue to be for an indefinite period.

It will be noted that the crude-oil production of the United States, Venezuela, and the Middle East accounts for 81 per cent of the world total and these same countries have 86 per cent of the proven reserves. These three areas are responsible for practically all of the increase in petroleum output and proven oil reserves since 1940. In fact, the petroleum output of the remaining countries considered as a group is now substantially less than it was prewar.

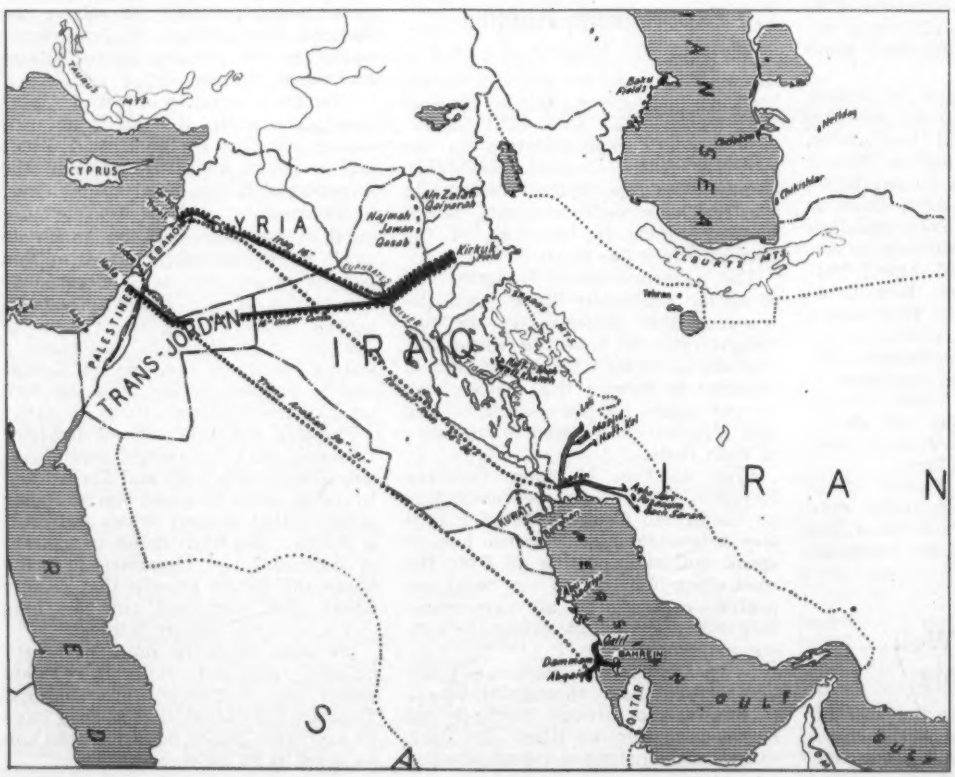
The Soviet Government from its beginning has been largely dependent on petroleum techniques and equipment developed in the United States for the expansion and maintenance of its oil properties. While the government is still an important buyer of equipment and supplies from this country, its "iron curtain" policies have delayed postwar rehabilitation and expansion of its oil properties, particularly in the case of petroleum-refining facilities. The government's objective is to triple present production to supply enlarged domestic needs and also to become a factor in world petroleum markets. There are no indications that this program can be carried out quickly.

Crude-oil production in the remainder of Europe is also below prewar.

TABLE 1—SUMMARY—CRUDE-OIL PRODUCTION AND RESERVES

	Current output bbl. daily	Per cent total	Proven reserves (1,000 bbl.)	Per cent total	† Year's supply
United States	5,260,000	63.0	24,200,000*	35.7	12.6
Venezuela	1,225,000	14.7	7,500,000	11.1	16.7
Middle East	865,000	10.4	26,600,000	39.3	84.2
U.S.S.R., including Sakhalin	450,000	5.4	5,700,000	8.4	34.7
Remaining countries	544,000	6.5	3,700,000	5.5	18.6
Total	8,344,000	100.0	67,700,000	100.0	22.2

*Includes condensate. †Ratio of current production to proven reserves, commonly termed "Year's Supply." Proven reserves by L. F. McCollum, Standard Oil Co. (New Jersey).



Pipe lines under construction and those authorized and projected indicate that crude-oil deliveries to the Eastern Mediterranean will exceed 1,000,000 bbl. daily within 5 years

TABLE 2—CRUDE-OIL PRODUCTION PER WELL IN PRINCIPAL OIL-PRODUCING AREAS

Area—	Current production (bbl. daily)	Estimated No. of Active wells	Production per well
United States	5,260,000	435,000	12
Venezuela	1,225,000	5,130	238
Middle East (exclusive of Egypt)	865,000	200*	4,325

*Does not include small number of observation wells.

The most important areas of Austria, Hungary, Poland, and Romania are now within the boundaries or under the domination of the U.S.S.R. and their operating future is similar to that of the prewar Soviet oil areas.

Prewar the crude-oil production of the Far East, centering in the East Indies, totaled 220,000 bbl. daily. More than 2 years after V-J Day the production is approximately 25 per cent that of 1938. Unsettled political conditions in the East Indies and Burma where the bulk of the crude oil was produced have delayed American, Dutch, and English owners in their rebuilding programs. It is now certain that 2 or more years will elapse before the oil operations of the Far East, considered as a unit, return to prewar levels.

Three Areas

The inescapable conclusion from a geographical analysis is that the bulk of world oil supplies over the next several years, during which the postwar political and economic pattern of this generation will be determined, will come from three areas—United States, Venezuela, and the Middle East. This basic situation can be further delineated by pointing out that this country's imports and exports are about in balance, changing a 1938 situation in which its petroleum exports were 3½ times imports. Exports (540,000 bbl. daily, July this year) are now about the same as they were in 1938, but much larger imports are required to support these shipments to other countries.

This situation in effect means that, so far as world supplies outside the United States are concerned, consumers for an indefinite period must look to Venezuela and the Middle East for the bulk of their petroleum. Unless crude-oil output is substantially expanded in this country, this nation's petroleum-export policy, a major factor in our world trade position, can be maintained only as long as domestic crude-oil production is supplemented with large imports.

Equally obvious is the fact that these tremendous oil resources of Venezuela and the group of countries of the Middle East will continue to be of major importance in future political trends. The presence of these resources in distant lands must be balanced against the fact that they were discovered, developed, and are now owned almost exclusively by nationals of the United States, the United Kingdom, the Netherlands, and France.

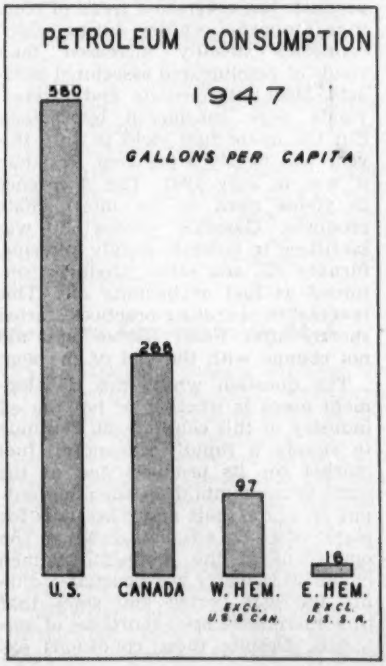
Before turning to another phase of oil geography, Table 2 reflects a situation which merits study by those who direct the foreign and domestic policies of this country.

Transportation

"Why," it may be asked, "with all these petroleum resources are we faced with shortages." Part of the answer has already been indicated. Postwar demands in this country and throughout the world, particularly the military and rehabilitation requirements, have been greater than anyone anticipated. Political uncertainty and lack of equipment and supplies have delayed expansion, extending from exploration to the manufacture of petroleum products.

Probably the weakest link in the supply chain has to do with transportation. It was thought that the large additions to tanker capacity during the war would result in postwar surplus for water movements. A shortage has developed in recent months. A similar situation exists in pipe-line-transportation facilities. Both conditions are being improved in this country and elsewhere.

The situation in the case of western Europe is to be remedied by the construction of a 30-31-in. line from Abqaiq field in Saudi Arabia to Sidon, Lebanon, a distance of 1,050 miles, and later a 34-36-in. 800 mile line from the upper Persian Gulf connecting to



Kuwait and Abadan, Iran, with a terminal at Latakia, Syria. A program for 16-in. lines from Kirkuk in northern Iraq to Haifa, Palestine, and Tripoli, Lebanon, is now under way and plans for a line of 26-in. diameter have been announced. Should all these programs be completed within 5 years there would be sufficient pipeline capacity to deliver in excess of 1,500,000 bbl. of Middle East crude oil to the eastern Mediterranean. This will reduce Western Hemisphere approximately 3,000 miles. The 30-31-in. line is to be built by Trans-Arabian Pipe Line Co. (American) and the 34-36-in. line by Middle East Pipe Line, Ltd., (American and English).

Petroleum Consumption

Unfortunately data on world petroleum demand, outside the United States, Canada, and a few other countries, are not as accurate and up to date as the information on supplies. In general there have been large increases in demand everywhere since the close of World War II, a development which is the opposite of what had been expected by many who hazarded predictions during the war period. In the case of the Western Hemisphere this large growth in demand is a reflection of general prosperity which has added to the number of consumers, and what is more important, increased the consumption per capita.

In Europe and several other sections of the Eastern Hemisphere it is impossible to differentiate between what might be termed "normal" consumption and that which is temporary in the sense that it represents aid (principally the United States) to war-devastated countries. It is sufficient to point out here that the latest global war greatly increased the importance of petroleum in the economies of all peoples. Applications of the internal-combustion engine have greatly expanded everywhere and petroleum fuel has strengthened its competitive position in relation to coal and all

TABLE 3—PERCENTAGE OF DISTRIBUTION OF POPULATION, AREA, AND PETROLEUM

	Population	Area	Petroleum—Production	Petroleum—Reserves	Petroleum—Demand
W. Hemisphere	12	30.4	82.4	49.4	73
E. Hemisphere	88	69.6	17.6	50.6	27
U. S.*	6.5	*5.9	63	35.7	63.5

*Continental United States.

World population, according to 1947 World Almanac, is 2,150,959,919 and area 51,345,066 sq. miles. Estimated current petroleum output in this compilation is 8,344,000 bbl. daily consumption, 8,258,000 bbl. daily, and proven reserves 67,700,000,000 bbl.

other fuels. Assuming a return to world stability, economists are in agreement that petroleum demands will continue to expand in all parts of the world.

The lack of uniformity in petroleum supplies has its counterpart in the distribution of petroleum demands. This situation is reflected in Table 3.

This country and Canada account for about 67 per cent of the world petroleum consumption as of today. The other world petroleum-consuming center is western Europe and the United Kingdom, with the result that the United States, Canada, and western Europe are consuming approximately 81 per cent of the greatly enlarged petroleum supplies. The consumption per capita in the remainder of Europe, including the U.S.S.R., is small and present consumption of Asia and Africa, which includes more than half of the world population, is less than that of one of our larger oil-consuming states.

The importance of the Eastern Hemisphere having its own supplies within a few years is readily apparent. If properly utilized they will supply the heat, power, and fuel which will enable important sections of the Eastern Hemisphere to advance their standards of living so that they will be comparable with ours and at the same time make it possible for other areas represen'ing more than 70 per cent of the world's population to start emerging from an economic darkness in which there has been little change over many centuries.

Conditions pertinent to this situation are summarized in Table 4.

TABLE 4—ESTIMATED CONSUMPTION PER CAPITA—1947

	Gal. per capita
United States	580
Canada	268
Western Hemisphere (exclusive of United States and Canada)	97
Eastern Hemisphere (exclusive of U.S.S.R.)	16

United States

Because we are by far the largest producer, refiner, transporter, and consumer of petroleum any changes in the geography of oil regardless of location are of importance to us. The Society of Automotive Engineers is primarily interested in the specifications of petroleum products and their utilization within the boundaries of this country. Those who are associated with the many ramifications of the automotive industry are also rightly concerned with the fact that only through the united efforts of the entire petroleum industry were we able to end this year's season of the maximum gasoline consumption in September without serious shortages. Some of you have been told by your supplier that you may not be able to purchase all the furnace oil that you need as winter fuel.

Without attempting a detailed discussion of the causes of these developments Tables 5 and 6 based on Bureau of Mines report are presented with the thought that they summarize conditions which are responsible for whatever shortages have occurred.

TABLE 5
Domestic Demand for Petroleum Products First 7 Months of 1947 Compared to Same Period in 1941

	1947 (1,000 bbl.)	Pct. gain over 1941
Motor fuel	446,596	20.0
Kerosine	58,343	48.4
Distillate	170,175	64.2
Residual fuel	298,305	38.8
Total (all products)	1,126,370	35.4

TABLE 6
Percentage Yields of Products of United States Refineries July 1941 and July 1947

	Per cent	
	1947	1941
Gasoline, naphtha	40.6	44.2
Kerosine	5.6	5.3
Distillate	16.3	13.4
Residual	23.9	24.3

The outstanding development shown in Table 5 is the large increase in the domestic consumption of the intermediate products consisting of kerosine and distillate, the latter classification including diesel fuel, furnace oil, and gas oil. The gain of 28 per cent in the demand for residual fuel oil is also much greater than that of motor fuel. The record gains in requirements for the intermediate products and residual fuel are accounted for by the needs of industry, and millions of consumers fully employed, plus new uses.

The large demands for intermediate products has reversed a trend of more than a quarter century during which refineries steadily increased their yields of gasoline and associated products. Most intermediate and residual yields were considered byproducts. But the motor-fuel yield in July this year was nearly 4 per cent less than it was in July 1941. The difference in yields went to the intermediate products. Gasoline production was sacrificed in order to supply kerosine, furnace oil, and other products consumed as fuel or burning oils. This reversal in operating practices started shortly after Pearl Harbor and did not change with the end of the war.

The question which this development poses is whether or not the oil industry of this country can continue to supply a rapidly expanding fuel market for its products and at the same time maintain an adequate output of motor fuels and diesel oils for markets which are also growing. The operations of the producing branch of the oil industry were curtailed during the war period and since that time there have been shortages of materials. Despite these conditions exploration and developments operations are now being carried on on the broadest and most intensive front in the history of the petroleum industry of this country. It is too early to accurately gage the long-range results of this postwar drilling and production program.

The petroleum supply-demand situation in this country, 2 years after the close of a world war, does suggest that the time may not be far distant when in the interest of a sound national economy including preparation for another possible emergency, thought should be given as to how we can obtain the maximum returns from one of our most valuable natural resources.

The thought that the writer wants to suggest here is that wholly aside from the enlarged output in new and old fields of this and other countries there is a responsibility that rests with the refiner of petroleum and those who use the products he manufactures. The responsibility of the refiner centers around a program of increasing the yields of products for which there are no substitutes at comparable prices. In the case of the designer of automotive equipment it would seem that the duty of the manufacturer, cooperating with the refiner in the matter of required specifications, will be to obtain the greatest performance possible from the available petroleum derivatives.

Argentina's Liquid Fuel Need Set at $50,000,000

Argentina's liquid fuel imports for 1948 to meet the country's domestic needs, according to a government announcement, must include: 353,000 cu. m. (2,220,125 bbl.) of crude oil; 30,000 cu. m. (192,642 bbl.) of aviation gasoline; and 600,000 cu. m. (3,773,585 bbl) of regular gasoline.

The $50,000,000 worth of imports will be made through Yacimientos Petroliferos Fiscales, the official oil monopoly.

T.L.L. Production Goes Up

Crude-oil production for October from Trinidad Leaseholds, Ltd.'s own fields was 17,714 bbl. daily, the highest daily average since last June when production amounted to 18,209 bbl. daily. Total output for October was 549,124 bbl. as compared to August's 534,065 bbl. The daily average for September was 16,985 bbl.

Colon Output Shows Drop

Venezuelan crude-oil production of Colon Development, Ltd. (Shell) for the 5-week period ended November 3, was 429,468 bbl., or 12,271 bbl. daily, compared with Colon's crude-oil output of 360,116 bbl., or 12,438 bbl. daily, for the 4 weeks ended September 29.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Equipment Exports Pared

WASHINGTON.—There are broad differences of opinion within the administration as to the ability of this country to furnish all of the products and materials needed for European recovery. But thinking in the domestic oil-equipment industry so closely parallels that of the Harriman committee that the equipment men might well have written the committee's report.

This was brought out, even in advance of the Harriman report release, at a meeting of equipment manufacturers. The meeting had been called by OGD Director Max W. Ball to discuss oil-industry needs set forth in the report of the Committee for European Economic Cooperation.

The equipment men dismissed as of little importance the amount of money involved, in the face of the one stark fact that the needs set forth for Europe, plus those of the United States and other areas, added up to more than the world's capacity to produce.

They emphasized that everything the European oil industry will need also is vitally needed in the United States, and concluded that if Europe's needs are met at the expense of the domestic industry it will merely transfer from that continent to this country the emergency shortage which, in part, made the Marshall plan necessary.

Details of Needs Lacking

One thing that has been brought out by discussions is the lack of detail in the CEEC report regarding Europe's equipment needs. Apparently, it is felt, the committee reached into the air for a figure, and there is nothing to show what is needed for production, refining, transportation or other individual purposes.

The Harriman committee, which squeezed a lot of water out of the estimates, expressed doubt on this point of oil-equipment needs. The equipment manufacturers told Ball it would be futile to attempt any planning until it was known just what each country needed.

Meanwhile, from the steel industry, comes word that the country's steelmakers foresee the possibility of having to abandon markets carefully nurtured in the Americas, Asia, and Africa to fill Europe's needs. The overall exports to Europe are not viewed as too large for the industry's capacity, taken alone, but will not permit "business as usual" in other export areas unless the needs of domestic consumers are to go unfilled. Controls, they hope, will be limited to directives to producers to set aside a certain production for Europe, without any allocation of the remainder of their output.

Oil Controls Again?

CONSUMER rationing and price control of products in short supply which basically affect the cost of living or industrial production, including fuel, are among the 10 steps urged upon Congress November 17 by President Truman to avoid further inflation.

Other recommendations by the President called for extension and strengthening of export controls, authority to allocate transportation facilities and equipment, allocation and inventory control of scarce commodities, and imposition of wage ceiling where essential to maintain necessary price ceilings.

Outlining his antiinflation program in a message asking 597 million dollars for stopgap aid to Austria, France and Italy, the President pointed out his proposals called for consumer rationing on a "highly selective" basis and not for return to wartime general control. He pointed out also that several months will be required to make any rationing effective, so that it is necessary to grant the authority now so that preparations can be made in advance for any emergency that may arise.

There is considerable doubt in Washington as to how far Congress will go along with the President on the antiinflation program. Many members have strongly indicated their opposition to the return of any sort of rationing or price control, the lifting of which was forced by the Republicans over the protests of the administration.

Aramco Tossed to D. of J.

RECITING the charges explored by his war investigating committee during hearings on sales of oil to the Navy by Arabian American Oil Co., Sen. Owen Brewster of Maine over the weekend suggested that the Department of Justice look into the matter "with a view to assuring that the interests of the United States and its citizens would receive appropriate protection."

Brewster, in a lengthy letter to Atty. Gen. Tom C. Clark, asserted that the evidence indicates that Saudi Arabian oil could be laid down in New York Harbor for approximately one-half the current price "and might contribute very materially to easing the growing shortage of petroleum in the eastern United States as well as contributing to the relief of the consumers in the matter of price."

The senator charged that the concession, which he valued at $10,000,000,000, was preserved for Aramco largely through the $80,000,000 lend-lease contribution which he said the Government made to Saudi Arabia during the war.

He also recited charges previously made that the company was getting $1.05 a barrel for oil which it sold to France for 85 cents, had sold to the Japanese at 70 cents before Pearl Harbor and had originally offered to this Government at 40 cents.

Brewster told Clark it was indicated that the Arabian oil would be sent to Europe and the Far East to avoid the crosshauls that might otherwise result from exports from the United States to those areas, but did not suggest how their needs would be supplied if the oil were brought to this country. Nor did he make any concrete charges of violation of the laws on which the Department of Justice might act.

Gas Bill Action Delayed

THERE is little likelihood that any action will be taken on the Rizley gas bill during the special session of Congress.

Opposition in the Senate Interstate and Foreign Commerce Committee which kept the bill from going to the Senate floor last session was based largely on representations of the Federal Power Commission that the legislation would serve to increase the price of natural gas to consumers. Now the gas industry is having a thorough study made by an outside agency of just what effect the field-price and other provisions of the bill would have upon gas prices, believing that the increase, if any, would be so small that no utility commission would grant an increase to distributing companies.

When that study is completed, probably early next year, the industry will go to the committee and ask for an opportunity to present its findings.

Meanwhile, industry representatives are popping in and out of the FPC offices, talking about the bill with members of the commission. It is understood that Chairman Nelson Lee Smith and Commissioner Har-

rington Wimberly agree that there is some justification for the changes which the industry seeks although objecting to some of the phraseology of the bill as not sufficiently definitive. The other two members, Commissioners Claude L. Draper and Leland Olds, are said to be less responsive to industry representations.

Because there is a vacancy on the commission, for which President Truman's nomination of Burton Behling has not yet been confirmed, the stalemate between the two pairs of commissioners cannot be broken, and it is this equal division, it is said, that has held up issuance of the commission's report on field price.

The eventual result of the conferences which have been going on is expected to be a general meeting between the industry and the commission at which an agreement on the bill will be worked out. This meeting may come when the industry has accumulated the information necessary to support the contention that the proposed revision of the natural gas act will not add to consumer costs.

More War Oil Planning

NOBODY knows what the next war will be like, and everyone hopes it won't happen, but planning for it, nevertheless, goes on apace.

To the several boards which are mapping out military strategies, President Truman last week added one which will plan the industrial and civilian mobilization for World War III.

This is the National Securities Resources Board, of which the Secretaries of the Treasury, Defense, Interior, Agriculture, Commerce and Labor will be members, with Arthur M. Hill of Charleston, W. Va., as permanent chairman. It will be the agency whose activities are of most importance to the oil and other basic industries.

Not only will it make the policies concerning industrial mobilization and for unification of the activities of the federal agencies concerned with production, procurement, distribution and transportation of both military and civilian supplies, but it will draft definite programs for the effective use of the nation's natural and industrial resources, the maintenance of the civilian economy, and the adjustment of the national economy to war needs and conditions.

Planning for war is, of course, the major peacetime activity of the military and, after the unfortunate experiences in the first world war in getting war production under way, much thought was given prior to 1941 to the mobilization of industry. But it will be remembered that industrial mobilization in the last war started out on a piecemeal basis, and fell short in some very important areas such as plans for maintaining the oil economy of the East Coast when our tankers were almost driven off the sea.

Realizing that the next war will be different in, for one thing, that we will have no long period in which to prepare for the actual fighting, the planning is different. The objectives are to be able to raise a maximum fighting force from among the reserves that are now being built up; to have on hand ample stockpiles of strategic materials which we lacked when ocean traffic was interrupted last time; to have key industries thoroughly trained in war production, through the medium of "educational" orders in peacetime; and to be able to convert the whole nation from peace to war practically overnight.

To these ends, the board will make continuous studies of the relationship between potential supplies of, and potential requirements for, manpower, resources and productive facilities in time of war, and the strategic relocation of industries, services, government and economic activities which must be kept going under any conditions.

It's Not Imperialism

THE strategic importance of the Middle East is summed up in the one fact that all of the Persian Gulf oil area, with reserves of possibly 30 billion barrels or more, lies within 90 minutes flying time from Iran.

With this area in the hands of an unfriendly power, the rehabilitation of Western Europe and the economic development of Africa and Southern Asia could be restricted for an indefinite period.

These facts were brought out last week in a frank discussion by Loy W. Henderson, director of the State Department's Office of Near Eastern and African Affairs, at a meeting of the Academy of Political Science.

Henderson did not charge that Russia, in attempting to secure a concession in northern Iran, had designs on other Middle East areas. He did, however, point out that the Persian Gulf points could be reached quickly by air from that country, and he emphatically asserted the determination of the United States to maintain the independence of the Middle East.

A display of interest in the disposition or control of petroleum "is not necessarily a manifestation of sinister imperialism," Henderson declared.

"We are learning that at this stage of industrial development oil, like food, is essential to the operation of our very economic life and to the maintenance of what we consider as civilization.

"In view of their economic and strategic importance the Middle East and Southeast Europe are prizes most tempting to an aggressive and ambitious great power. Such a power might well be able, if once in possession of the strategic facilities and economic resources of this area, to decide the destinies of at least three continents and to cast a dark shadow over the whole world for many years to come."

NPC May Meet Early

WITH NPC committees rushing through studies of problems which must be solved with a minimum of delay if they are to be solved at all, Secretary of the Interior Krug is expected to ask Chairman Walter S. Hallanan to call a meeting of the council in December. The next meeting, normally, would not be held until about the second week in January.

Foremost subjects in the minds of Oil and Gas Division officials are the domestic supply situation and the petroleum phases of the Marshall plan. NPC committees have been set up to study both matters, and the supply committee met last week in Chicago for a preliminary thrashing out of its particular problem.

It has been pointed out that if the council does not meet until January to receive reports of its committee, the supply situation will then be entering upon its most acute period. On the other hand, if the committee can submit its report and recommendations next month, there will be a few weeks' leeway in which to perfect plans for meeting any shortages which may occur, always provided, of course, that it proves possible to lay out a plan which will meet the situation.

Similarly, if the committee studying the Marshall plan does not report until January it may come in just about the time the President outlines his 4-year program, whereas if industry views can be made known earlier the government agencies will have an opportunity to give them some consideration.

German Oil Muffed

CONSIDERABLE criticism of the handling of Germany's oil problem by the military government in Berlin is being voiced in industry circles, and is shared in even by some administration officials in Washington.

Long efforts to have distribution returned to the hands of the industry only recently began to bear fruit, and oil men who have visited the United States zone have returned highly dissatisfied with the manner in which oil matters are being handled.

With the two zones consolidated, and the United States due to take over practically all the cost of governing them, it is believed definite action should be taken to correlate production, refining, importation and distribution, and put the industry back in the hands of the companies which ran it before the war, under necessary governmental supervision.

PERSONALS

Standard-Vacuum Official Has Wide Foreign Service

E. W. BERLIN, recently named head of the producing department of Standard-Vacuum Oil Co., in 1929 joined Nederlandsche Koloniale Petroleum Maatschappij and worked in the Netherlands Indies until the beginning of World War II.

He graduated from the University of California at Berkeley with a B.S. in petroleum engineering in 1926 and after 3 years' experience in the California producing oil fields he embarked on his foreign career.

During the war Berlin, a colonel, served as area petroleum officer for the China-Burma-India theater and as additional duty aided in the planning of air strikes over the Netherlands Indies and other Far Eastern areas.

Following his release from the armed forces Berlin joined Standard-Vacuum's New York staff in January 1946 as assistant head of the producing department, which position he held until his appointment last month as head of that department succeeding H. W. McCobb who was elected to the board of directors of the company.

Berlin was born in Sistersville, W. Va., raised in Tulsa, and now resides in Scarsdale, N. Y., Westchester County.

A. P. Loscamp, formerly district manager at Midland, Tex., for Union Oil Co. of California, has been named manager of the West Texas division. The Midland office will become division headquarters. Other changes in personnel affected by the move include: **Sam C. Giesey** and **Charles L. Sherwood,** district geologist and district landman, respectively, promoted to division geologist and division landman; **J. S. McNulty,** named division engineer in charge of the producing department; **H. L. Swords,** appointed supervising geophysicist for the division; and **Robert C. McFadden, Jr.,** and **J. B. Jordan,** who have been assigned as geologists.

William L. Merrill, engineer for Gulf Oil Corp., and **Wallace W. Wilson,** formerly with California Research Corp., have joined the University of Texas petroleum engineering department staff.

L. R. Morris, formerly with Richmond Exploration Co. in Colombia, has been made assistant manager of the company in Maracaibo, Venezuela.

Frank D. Howell, division superintendent of the North Dominion district of the Dominion Natural Gas Co., Ltd., Buffalo, N. Y., has been promoted to division superintendent of the consolidated North Dominion and St. Thomas districts of Ontario. Howell is a past president of the Canadian Gas Association. **Lyle D. Burdick,** formerly division superintendent at St. Thomas, has been made division superintendent of the Niagara Falls district of the Republic Light, Heat & Power Co., Inc.

Jake L. Hamon and **Ralph E. Fair,** San Antonio, independent oil operators, have been named to the board of directors of Lucey Petroleum Co., Dallas. Hamon, Fair and **Robert G. Payne,** president of Lucey, were named by the directors as a three-man executive committee to handle affairs of the company.

H. C. PYLE

Howard C. Pyle, vice president of the Bank of America in charge of oil loans, has resigned to become president of Continental Consolidated Corp., which November 1 purchased from **Robert V. New, R. F. Ingold,** and the Harwood Foundation their interest in Continental Corp., Continental Development Corp., and Continental Northern and Southern Corps. Pyle, before joining Bank of America, had served as assistant chief petroleum engineer and geologist, and later as chief production engineer, of Union Oil Co. of California. During the war he served as petroleum officer on General Eisenhower's staff.

L. W. Price, assistant petroleum geologist for Michigan's Department of Conservation, has been appointed petroleum engineer to supervise locating, drilling, completing, and plugging of oil and gas wells within the

At the first regular monthly meeting since their organization the Dallas Geophysical Society this month elected their first permanent officers. Left to right are W. W. Newton, first vice president; A. E. McKay, president; and D. Ray Dobyns, secretary-treasurer. Chester J. Donnally, second vice president, is not shown. The Dallas society, which will petition for affiliation as a local section of the Society of Exploration Geophysicists, is the second local society to organize under the new provisions of the S.E.G. National Constitution. The Tulsa section was first

PERSONALS

state. He succeeds **W. L. Daoust,** who recently was appointed chief of the geological survey division.

W. H. LINTON

W. Henry Linton, former manager of the refinery accounting department for Sun Oil Co., has been appointed administrative assistant to **Clarence H. Thayer,** vice president in charge of manufacturing. Linton joined Sun Shipbuilding & Dry Dock Co., a wholly owned subsidiary of Sun Oil Co., as clerk in the accounting department in 1919. In 1926 he was placed in charge of the Marcus Hook, Pa., refinery, and in 1937 was made office manager and chief accountant there. He was appointed manager of the refinery accounting department in 1942.

William H. Carter, Lubbock, Tex., recent graduate in geology from the University of California, has joined the Permian Basin district office of Cooperative Refinery Association in Midland.

A. P. Allison, Sun Oil Co. district geologist at Houston, will move to Shreveport where he will head the company's new district offices in charge of the North Louisiana and Arkansas areas.

A. B. Weiss will head Pure Oil Co.'s new district drilling and production office at Midland, Tex., directing operations formerly handled by Pure's division headquarters in Fort Worth. Weiss was formerly in the production department at Pauls Valley, Okla.

Hugh Puckett, formerly of the Superior Oil Co. geological staff in Midland, Tex., has resigned to join Lion Oil Co.'s district geological staff at Midland.

Bruce Ganek and **John Nicholson** have joined the geological staff of Standard Oil Co. of Texas in the Midland offices.

E. F. Underwood, wholesale sales manager for Skelly Oil Co. at Kansas City, has resigned to become executive vice president of Graco Oil & Refining Co., Denver, Colo.

M. M. Conn has resigned as superintendent of drilling and production in the Permian Basin for Atlantic Refining Co. to become division manager of Trinity Drilling Co.'s West Texas-Southeast New Mexico operations. Trinity's newly-created division offices are in the Crawford Hotel, Midland, Tex.

Alvin M. Marks, assistant employe relations department manager for Standard Oil Co. of New Jersey's Bayonne refinery, has been named head of the department to replace **F. C. Donovan** who has been transferred to the company's affiliate at Palembang, Sumatra, as employe relations manager for the producing and manufacturing departments. Also assigned to Sumatra was **Olaf Olsen,** training supervisor and office manager of Standard Oil Development Co.'s personnel department at Bayway. **Joseph J. Slavin** has been named assistant to Marks, and **James W. Herwig** has been promoted to office manager.

M. L. McGee, Vickers Petroleum Co., Inc., has moved from the Oklahoma City district office to Midland, Tex., as division landman. The Wichita company will establish a West Texas-New Mexico division office in Midland.

Dan O. Howard, former petroleum engineer and petroleum geologist for the oil and gas division of the Oklahoma Conservation Department, and who recently joined Warren Petroleum Corp., has been appointed natural-gas engineer to handle evaluation of new areas and make studies of gas-oil ratio tests. He graduated from the University of Oklahoma in geology in 1928.

Ernest L. Berg, Wilshire Oil Co., has been transferred from the company's Los Angeles headquarters to Midland, Tex., as district geologist. Wilshire is entering Permian Basin operations and will have a district office at Midland.

William A. Underwood, assistant to the comptroller of Standard Oil Co. (Ind.), and **Yates S. Williams,** assistant comptroller of Reynolds Metals Co., have been elected assistant comptrollers of Standard Oil Co. (Ind.)

J. P. Gould, chief engineer in charge of drilling and production for Iraq Petroleum Co., Ltd., has been touring the Permian basin to observe methods used in the industry throughout this area.

Don Carroll, formerly with the United States Geological Survey in Washington, has been appointed assistant to **Max W. Ball,** director of the Oil and Gas Division of the Department of the Interior.

Dr. Raymond C. Moore, scientist and research director of the State Geological Survey of Kansas, has been named traveling lecturer for the American Association of Petroleum Geologists' lecture series, November 10 through December 16.

John W. Boatwright, formerly head of the sales research and budgeting departments for Standard Oil Co. (Ind.), has been appointed general manager of the distribution economics department of the company. Boatwright, who has directed the commercial research for Standard since 1938, is a member of the economic advisory committee to the Interstate Oil Compact Commission and the statistical advisory committee to the American Petroleum Institute. **D. S. Warning** has been appointed manager of the commercial research division of the distribution economics department for Indiana Standard, and **R. M. Eberly** has been appointed manager of the coordinating division of the distribution economics department.

Guests of the Houston chapter of Nomads at its November 10 meeting at the Houston Club included, left to right, H. H. Stayer, Humble Oil & Refining Co.; Jack Morris, Caribbean Petroleum Co., Maracaibo, Venezuela; E. E. McGar, Shell Co. of Ecuador, Quito, Ecuador; and E. Paul Hubbard, Gulf Oil Corp., who recently returned from Kuwait

Frank Strickland, producer-contractor, has opened an office at Mount Vernon, Ill.

Allan E. Dooley has joined The Texas Co. as industrial hygiene engineer.

W. B. Hovey has been appointed pipe-line superintendent in charge of construction and operation of Creole Petroleum Corp.'s new bulk terminal at Catia, Venezuela, the bulk plant at Nueva Caracas, and the products pipe line between the two.

W. H. Mengden, manager for Superior Oil Co. in Colombia, also has been named manager for the company in Venezuela with offices in Caracas.

M. K. Neptune, formerly assistant manager, Phillips Venezuelan Oil Co., has resigned to become assistant unit manager, West Edmond Hunton Lime Unit, which is operated by Sohio Petroleum Co.

Henry C. Rea, consulting geologist, was elected president of the Wyoming Geological Society at its recent annual meeting. Other new officers include: **M. P. Tixier,** Schlumberger Well Surveying Corp., first vice president; **W. S. Knouse,** Tide Water Associated Oil Co., second vice president; and **H. E. Summerford,** Chemical Laboratories, Inc., secretary-treasurer.

SHIFTS—

E. R. Woolfolk, geologist, Stanolind Oil & Gas Co., Farmington, N. M., to Midland, Tex.; **W. B. Slaughter,** superintendent, McCarthy Oil & Gas Co., Abilene to Orange, Tex.; **O. W. Wall,** superintendent, British American Oil Co., Midland, Tex., to Grayville, Ill.; **J. R. Montgomery,** engineer, Humble Oil & Refining Co., Refugio to Houston.

D. W. Rogers, superintendent, Delta Drilling Co., Bunkie, La., to Tyler, Tex.; **Darrell P. Miller,** engineer, The Texas Co., Erath to Shreveport, La.; **A. G. Stuckey, Jr.,** engineer, The Texas Co., Houma to Shreveport, La.; **L. L. Whiting,** geologist, The Texas Co., Mattoon to Salem, Ill.; **E. H. Almond,** superintendent, Warren Petroleum Corp., Newark, N. J., to Maud, Okla.

F. A. Schurtz, engineer, Shell Oil Co., Inc., Wichita to Graham, Tex.

Wm. E. Harrelson, superintendent, Rocky Mountain Drilling Co., Rock Springs, Wyo., to Denver, Colo.; **John S. Goodrich,** engineer, Magnolia Petroleum Co., Marlow, Okla., to Brownfield, Tex.; **John W. Tynan,** engineer, Phillips Petroleum Co., Kaw to Bartlesville, Okla.

P. T. Amstutz, Jr., engineer, Sohio Petroleum Co., Oklahoma City to Wichita; **W. J. Holt,** foreman, Interstate Oil Pipe Line Co., Wilson to Kinta, Okla.; **Elmer Vest,** foreman, Skelly Oil Co., Wilson to Fox, Okla.; **Winford M. Jones,** engineer, Stanolind Oil & Gas Co., Tulsa to Greggton, Tex.; **J. W. Dix,** engineer, Barnsdall Oil Co., Lewisville, Ark., to Oklahoma City; **Max T. Bruner,** engineer, Ashland Oil & Refining Co., Ashland, Ky., to Tulsa.

Allen L. Lewis, engineer, Shell Oil Co., Inc., Deer Park to Houston, Tex.; **Walter G. Kelly,** engineer, Colorado Interstate Gas Co., Texline, Tex., to Pueblo, Colo.; **George E. Carver,** geologist, Kerr-McGee Oil Industries, Inc., Borger, Tex., to Oklahoma City; **Murray C. Moffat,** engineer, Gulf Oil Corp., Crane to Fort Worth, Tex.

J. J. Crowder, engineer, Gulf Oil Corp., Houston to Bloomington, Tex.

P. M. Thompson, foreman, The Texas Co., Alexandria to Minden, La.; **Fred Johnson,** foreman, Gulf Refining Co., McLeansboro, Ill., to Henderson, Ky.; **Raymond B. Kelly, Jr.,** engineer, Humble Oil & Refining Co., Columbia, Miss., to Fort Worth, Tex.; **C. Flint Swatelle,** engineer, Kirby Petroleum Co., Laurel, Miss., to Houston; **Howard W. Shea,** engineer, Socony-Vacuum Oil Co., Woodbury to Mount Royal, N. J.; **E. M. Keely,** superintendent, Cities Service Oil Co., Philadelphia to Camden, N. J.

R. C. Pannier, superintendent, Gulf Oil Corp., Pittsburgh to Philadelphia; **Carl M. Landry,** engineer, California Co., Hamilton, Colo., to Laramie, Wyo.; **R. R. Turner,** engineer, Stanolind Oil & Gas Co., Rangely, Colo., to Thermopolis, Wyo.; **R. C. Williams,** foreman, Stanolind Oil & Gas Co., Edmond to Oklahoma City; **Charles R. Boyd,** foreman, Phillips Petroleum Co., Guymon to Edmond, Okla.

George L. Yates, engineer, Standard Oil Co. of Ohio, Oklahoma City to Wichita; **R. W. Blackburn,** engineer, Continental Oil Co., Ponca City to Hobbs, N. M.; **C. M. Ross,** geologist, Amerada Petroleum Corp., Aztec, N. M., to Ardmore, Okla.; **J. R. Latimer, Jr.,** engineer, Humble Oil & Refining Co., Little Rock, Ark., to Fort Worth; **R. E. Mitchell,** engineer, Shell Oil Co., Inc., Magnolia, Ark., to Columbus, Tex.

DEATHS

Emery A. Cook, 53, purchasing agent since 1934 for Amerada Petroleum Corp., died November 11 in Tulsa. A director of the International Petroleum Exposition, he was at one time vice president and director of the National Association of Purchasing Agents. Cook, before joining Amerada, was associated with Independent Oil & Gas Co. and with Twin States Oil Co. prior to that.

Fred S. Brinkman, 54, independent Tulsa oil operator since 1914, died November 12 in Tulsa. He was associated with Carter Oil Co. during the early part of his career.

George Huston McComb, 91, independent oil producer who had been active in developing the Butler and Bradford district fields and surrounding area, died November 7 in Rouseville, Pa.

Martin Lee Yount, 78, independent oil operator and oil field supply company president, died November 15 near Beaumont.

William A. Polley, 73, independent oil producer and drilling contractor who with his brother, John A. Polley, Jr., was active in developing the Bradford and Allegany fields, died November 12 in Bradford.

Buell F. Jones, vice president and general counsel of Standard Oil Co. (Ind.), died November 17 in Chicago. Jones joined the company in 1930 as an attorney. He was appointed general counsel in 1940 and was elected to the board of directors in 1942. He had been a vice president since 1945.

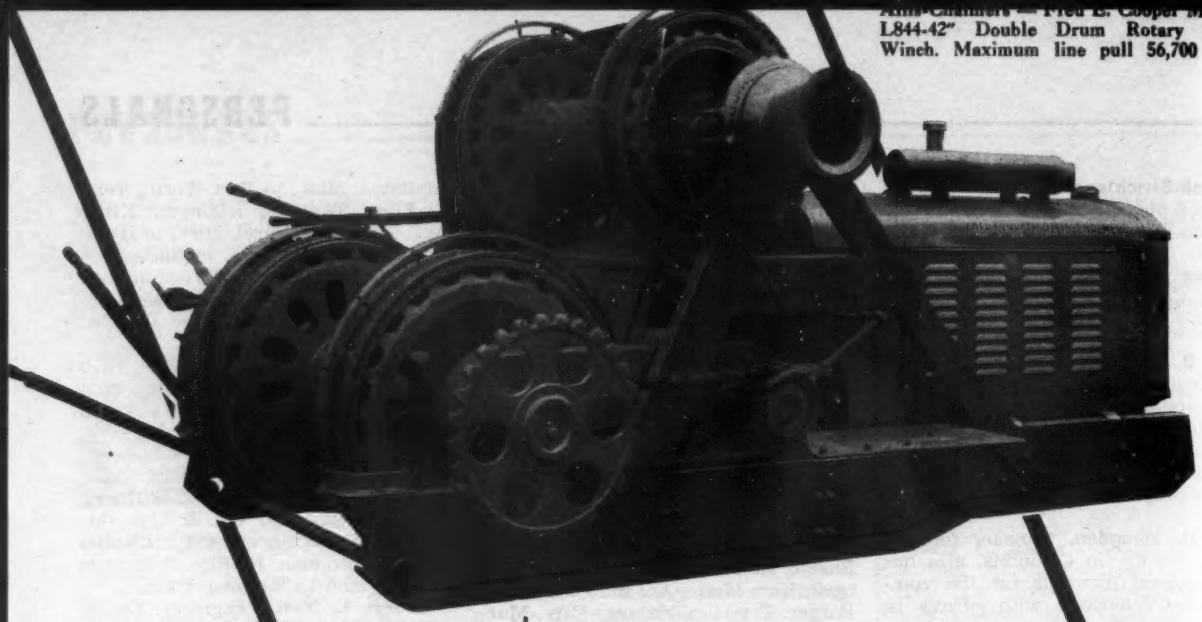
George A. Browne, 66, independent oil producer in the Bredinsburg district, Pennsylvania, died November 11 in Oil City, Pa.

Sylvester L. Cokain, 65, oil producer and resident of the Kennerdell district in Pennsylvania, died November 8 in Kennerdell.

L. S. Cooper, Sr., purchasing agent for the pipe-line department of Gulf Refining Co. and the production department of Gulf Oil Corp., died November 13 in Houston.

W. H. Keffer, 63, vice president in charge of production and pipe lines for Ashland Oil & Refining Co., Inc., and a director of the company, died November 17 in Ashland, Ky.

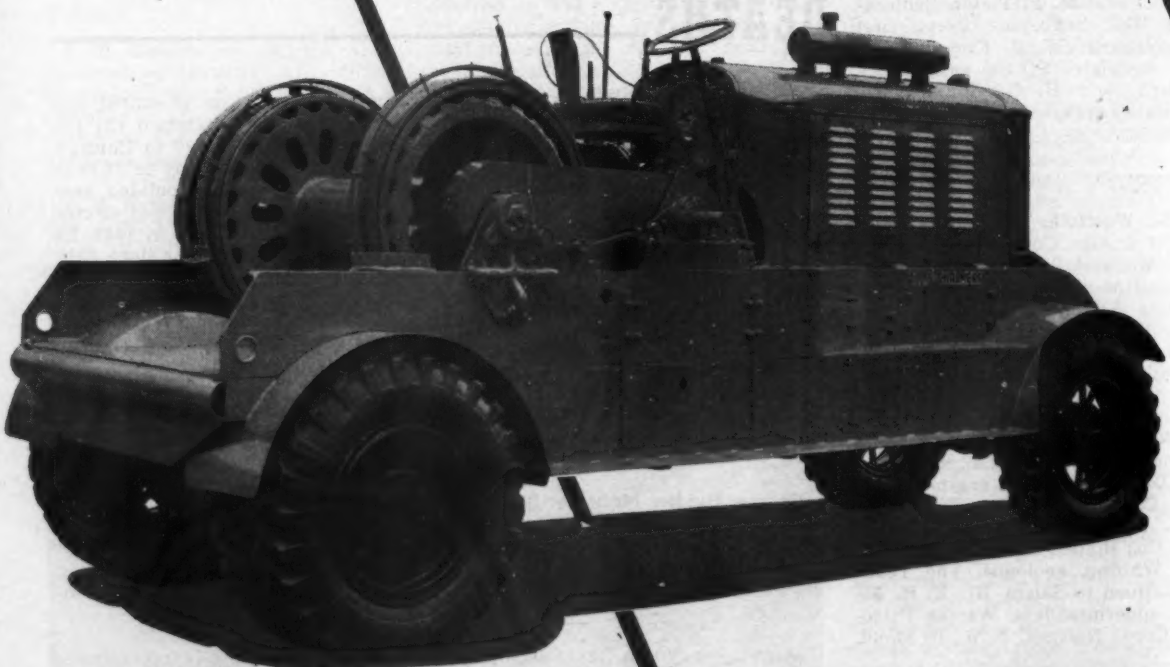
William J. McDonell, pioneer oil operator who aided in opening the Chipmunk and other oil fields in the Bradford area, died November 9 in Bradford, Pa.



Allis-Chalmers—Fred E. Cooper Model L844-42" Double Drum Rotary Skid Winch. Maximum line pull 56,700 lbs.

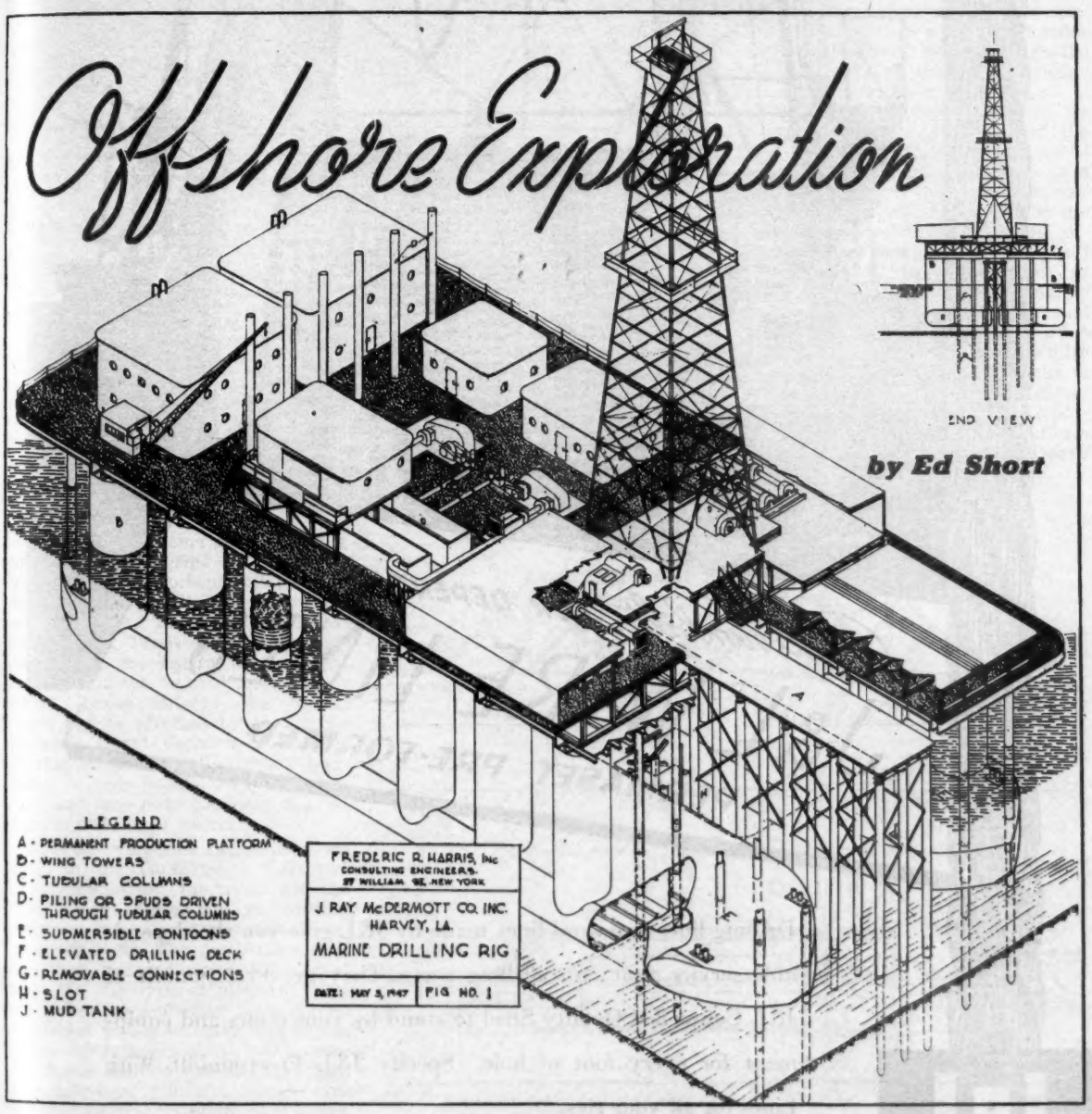
Model L units are designed to service the deeper wells with ease, speed and safety. Model L slow speed tractor type engines develop 590 ft. lbs. torque at 650 r.p.m. Transmissions are heavy duty, four speed tractor type. Each winch drum is equipped with TWO Cooper, patented, Circulating Air-cooled Brakes.

Model L tractor units are available with one or two drums. Model L Skid units are available with one, two or three drums. Catheads and rotary equipment are available for all models.



Allis-Chalmers-Fred E. Cooper Model L844-42" Single Drum Winch Tractor. Maximum line pull 56,700 lbs.

MOBILE DRILLING PLATFORMS SEEN AS NEXT POSSIBLE STEP IN Offshore Exploration



by Ed Short

DESPITE the Supreme Court "Tideland" decision and the suspension of offshore drilling plans by some oil companies, acquisition of Louisiana water bottoms was at its height during summer auctions. A recent survey shows that close to 2,000,000 acres (for which oil companies paid a total of over $14,000,000 in bonuses) are now under lease off the shore of Louisiana.

Fig. 1—The J. Ray McDermott & Co., Inc., marine drilling rig. This mobile offshore drilling unit floats on two pontoons each 240 ft. long by 58 ft. wide and 12 ft. deep. When over the water bottom-location pontoons are flooded until submerged to a depth of approximately 20 ft. Piling, driven through the bottom tubular columns in the superstructure, holds the rig in place

While one major operator has abandoned all plans until the tideland situation is cleared, even to the point of disbanding an engineering organization set up to work on the specific problems, and several others are holding plans in abeyance, Magnolia, Superior and Kerr-McGee companies are presently doing work in the Gulf of Mexico.

Although plans are in a dormant

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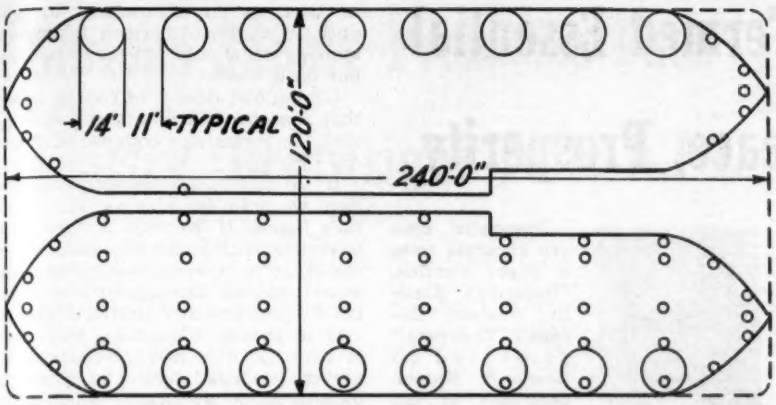


Fig. 2—Location of wing towers which provide stability and depth control when pontoons are sunk. These wing towers are 14 ft. in diameter

Company (in order of acres held)	Acres purchased	Total bonuses
1. Continental et al	396,728	$1,190,344
2. Magnolia	299,250	1,556,235
3. Shell	170,436	1,489,313
4. Humble	163,736	2,637,028
5. Stanolind	158,487	1,609,049
6. Pure	147,104	956,725
7. California	123,878	1,008,170
8. Superior	88,004	1,212,665
9. Texas Co.	81,810	885,517
10. Pan Amer.-Seaboard	80,911	180,688
11. Kerr-McGee	74,762	874,531
12. Barnsdall et al	50,253	429,444
13. Union of Calif.	16,662	200,000
14. Sohio	7,207	38,269
Total	1,848,228	$14,267,978

stage insofar as some companies are concerned, engineering considerations for future development still hold a very wide interest. With sale of water bottoms off the Texas shore and possibility that Texas (under the concessions of the federal Government contained in the original treaty under which Texas entered the union) might not be affected by the recent Supreme Court decision, a number of seismic fleets sailed from Louisiana waters during July and August and are now concentrating on a survey of Texas waters.

With an eye to the future development in the Gulf, many operators have emphasized the need for the development of a mobile-type drilling platform, as a means of reducing exploration costs. The work done thus far, they contend, indicates a real need for this type of platform. Two dry holes have already been drilled at distant points offshore and in the course of future search, many more dry holes will be drilled. Therefore a mobile-type platform which cannot only be quickly spotted but which can be moved quickly with a minimum loss of unsalvable equipment has attractive economic possibilities which will command the utmost of engineering consideration.

At the present time there are two outstanding designs for mobile platforms which, according to many Gulf Coast engineers, might play an important part in future offshore development. The factors which have a direct bearing upon the type of structure to be used in different Gulf areas are numerous and complex; and while it does not appear reasonable to expect (at this stage of development) one particular type of drilling platform to meet all conditions for offshore drilling, these two designs appear to offer possibilities for wide application.

Two Designs for Drilling Structures

One of the two designs for mobile platforms is the J. Ray McDermott marine drilling rig, designed by M. B. Willey, chief engineer for the McDermott company. This unit consists of two hulls or pontoons which act as a base for the drilling platform superstructure. During movement to location or from one location to the other all drilling equipment will be in place on the platform. When in position on location, the pontoons are designed to be sunk far enough below the water surface so that wave action against them will be at a minimum. Piling, driven through tubular legs which extend down through the pontoons, are to hold the drilling structure in place.

The second method, designed by Fransho Co., Houston, involves the use of weighted fluid as a means of sinking and imparting stability to a drilling platform having submersible hulls as a base for setting on the floor of the ocean. Height of the superstructure above the hulls would be dependent upon the depth of water. In building such a mobile platform, the superstructure would be the maximum height possible without loss of the floating stability required to permit towing it out to location. If used in comparatively shallow water there would be no particular disadvantage if the platform were higher above the mean water level than considered necessary.

(Continued on page 86)

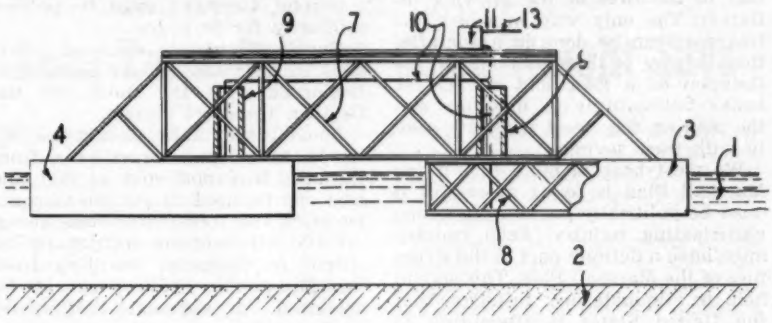


Fig. 3—End view of twin hulls and superstructure while afloat

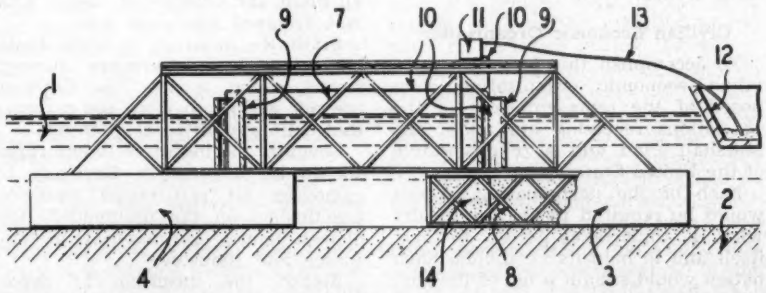


Fig. 4—Structure in position on floor of Gulf of Mexico. Design of the Fransho submersible drilling platform calls for the use of weighted fluid as a means of imparting stability at the base of the structure

Legend

1. Water.
2. Water bottom.
3, 4. Hull.
7. Superstructure.
8. Hull reinforcements.
9. Stabilizer columns.
10. System of pipes communicating with interior of hulls.
11. Air compressor for raising hulls.
12. Auxiliary barge holding weighted fluid to be used in mud-ballast compartments located in hulls.
13. Line from mud barge to structure.
14. Weighted fluid.

Marshall Plan Termed Essential To American Peace, Prosperity

Presented here are excerpts from a paper entitled, "Industry's Stake in Western Europe's Recovery," presented by Lewis H. Brown, chairman of the board of Johns-Manville Corp., during the twenty-seventh annual meeting of the American Petroleum Institute in the Stevens Hotel, Chicago, November 13.

THE necessity for helping Europe should be clear to the American public. It amounts to this:

We must prevent or win World War III.

Of all the nations in the world the United States is the only one in a position to give Western Europe the assistance required to start her on the road to recovery.

For the most part, our assistance will be in the form of food, supplies and loans.

In the final analysis the American people, through Congress, may have to decide upon one or a combination of ways to pay for the goods needed by Europe to start her on the road to recovery.

A vigorous reduction of government expenses internally might well provide a large portion of the means with which to meet the requirements for preserving Western civilization.

We could, of course, indulge in further deficit financing. But that is the very thing which most directly adds fuel to the fires of the growing inflation. The only way in which the financing can be done in a noninflationary way is through taxes or the flotation of a loan sold not to the banks but entirely to investors and the men on the street who buy solely with their savings.

We must bear in mind that if the Marshall Plan is to be successful it must be politically popular with each participating country. Each country must have a definite part in the structure of the Marshall Plan. This should help to eliminate any suspicion that the United States is attempting to infringe upon the sovereignty of any other nation.

Civilian Economic Organization

To accomplish this I suggest a civilian economic organization composed of the representatives of the 16 nations receiving aid under the Marshall Plan and a representative of the United States.

Each of the participating nations would be required to list specifically what it undertakes to do to help itself and to help its neighbors. Each nation would submit a list of the specific items and the quantities required.

In effect, then, the broad Marshall Plan for all of Western Europe would consist of 16 separate chapters, one for each participating country.

We must not lose sight of the fact that there can be no recovery of Western Europe without recovery in Germany.

Certain definite and immediate measures will be necessary to bring this about. These can be considered emergency prescriptions and should be given Number One priority.

First, Germany's unity must be restored as much as possible. A responsible German government for a united Western Germany must be created, but the basic controls must remain in our hands.

Second, Germany must be policed militarily for 50 years

Third, the vicious cycle of shortages in Germany should be broken, beginning with the Ruhr and the German transport system.

Fourth, the Ruhr should be relieved, as much as practicable, from the need to export coal, so that this coal can be used to get the German factories and transport system going.

Fifth, all political restrictions on output in Germany, resulting from the Morgenthau policy, should be abolished. An immediate halt should be declared on all capital reparations and the dismantling and removal of all plant and equipment except what was designed solely for war.

Sixth, the incentive to work should be restored in Germany through strong, sound, money. The Germans are not willing to work for currency that will buy little or nothing.

Seventh, the incentive to enterprise should be restored in Germany by removing all restrictions wherever practicable, on the unimpeded flow of men, money and materials in commerce and industry.

Eighth, the incentive to export should be restored in Germany by letting German exporters keep most of the foreign exchange their products bring.

Ninth, the will to live should be restored in Germany by holding out to the German people the hope of a better future in return for hard work.

Tenth, whether in Germany, England or anywhere else our aid should be used as an inducement to produce. With the American taxpayers' money, we should subsidize nothing but hard work.

Communist Russia, of course, hopes that America will do nothing to forestall the threatened collapse of Western Europe.

If we fail to take appropriate action we will be playing into Russia's hands. If Western Europe fails to recover, her economic collapse will result in a severe depression that would spread throughout the British Empire and the United States.

It is to our advantage, therefore, to take the necessary precautions to prevent such a catastrophe. Through incentives to production which adequate safeguards we can make sure that we are not engaging in another Operation Rathole but are simply providing the means of helping Western Europe to help herself.

Cost Less Than Depression

The cost of such prevention would be immeasurably less than the cost of a depression that conceivably could wreck our economy. And it would certainly be immeasurably less than the cost of dislodging Communist Russia from Western Europe and the British Isles at a later date.

It seems to me, there are only three courses that the United States of America can pursue.

First, we can withdraw entirely from the world scene and let the Communist elements sweep over the rest of the world while we depend upon our strength to protect our own continent from ultimate invasion and build an enormous and uneconomic public works program to offset the loss of our export trade.

Second, we can undertake to back the Marshall Plan and our foreign policy with as vigorous an organization as we used to win World War II. We can build an integrated organization for cooperation with our Allies just as we built an integrated organization with Great Britain and France for the invasion of Western Europe. We can be determined to live and let live and back our policy with force if necessary. At the same time we can be very practical and realistic making sure that our objective is not dissipated by people with social-service-worker minds who believe that merely spending money accomplishes the kind of objectives necessary in this type of economic war.

Third, we can go to war with Russia, either now or later, determined to liquidate the power of its leaders and stop the Western spread of Communism.

War with Russia would cost infinitely more than would the firm backing of the Marshall Plan and our foreign policy. In spite of all its obstacles and difficulties, I recommended the middle course in my confidential report to General Clay on July 19.

Serious Supply Problems Face Industry, Boatwright Tells A.P.I.

A FORECAST of the supply and demand situation of the period between November 1, 1947, and June 1, 1948, for the United States, with particular reference to gasoline, kerosine and distillates, by John W. Boatwright, general manager, distribution economics department, Standard Oil Co. (Ind.), before the Marketing Division at the American Petroleum Institute meeting, painted a picture of serious problems which will require strenuous efforts to alleviate.

The Pacific Coast and the Rocky Mountain areas, he found, would be just about able to meet their problems. The country east of the Rockies, even at the unprecedently high refinery-run load of 4,238,000 bbl. daily, which that territory had averaged for the past 5 months, could not meet its demand requirements for all products.

Boatwright painted the picture according to two assumptions, one operating at refinery yields sufficient to meet gasoline demands, ignoring the effect on the kerosine and distillate situation; the other operating at refinery yields sufficient to meet kerosine and distillate demands but ignoring the effect on gasoline demand.

The result of meeting the gasoline demand would leave kerosine and distillate stocks on June 1, 1948, short 33,700,000 bbl. Since stocks could not be drawn below minimum working level, consumers of kerosine and distillate would be short 12.4 per cent of their requirements; in some local areas, the shortage would be several times this percentage. This, Boatwright found, would be an intolerable position for the industry to take.

Proposed Solution

On the other hand, if the industry should choose to meet the kerosine and distillate requirements, gasoline stocks on that date would be 23,400,000 bbl. below minimum working stocks, with the peak consuming season ahead. This situation could not be tolerated, either.

The solution, as proposed by Boatwright, was for the industry to recognize it could not meet all the demands and to operate at refining yields which would equalize the supplies of gasoline, kerosine, and distillates according to the demand, leaving supplies of each of these products about 5 per cent below requirements. Then the public would be told that all consumers were being treated on an equitable basis.

To reach even this goal, each refiner east of the Rockies would have to increase his yield of kerosine 0.1 per cent and distillates 1.3 per cent over the same yields last winter, even in the face of increased crude runs.

In addition, Boatwright listed nine specific points on which action should be taken to the fullest extent possible.

1. Our import balance must be improved by bringing in any additional foreign crude or products or by reducing exports where possible without disrupting the economy of other nations.

2. Crude-oil production east of the Rockies must be held at maximum efficient rates and transportation or loading bottlenecks eliminated wherever possible.

3. There is growing concern about the adequacy of tankers for the East Coast, and all possible facilities should be rushed into this service.

4. Tank-car movement of crude into the Midwest will be slowed by winter, therefore more tank cars must be used to maintain present levels of refinery operations.

5. The industry must go even further in substituting truck transport for tank cars on local hauls, even beyond the financial break-even point. Tank cars must be made increasingly available for long hauls of both crude and products.

6. Unceasing effort must be made to insure that available supplies are distributed throughout the country in keeping with anticipated market requirements.

7. Competitive fuels must recognize their responsibility and carry their full share of the heating load. If other fuel industries adopt a program of equitable distribution of limited supplies, the winter problems of the petroleum industry will be substantially reduced.

8. The consumer must recognize his responsibility and adopt economical practices in utilizing petroleum products, both gasoline and heating oils.

9. Since production of high-octane gasoline at constant lead content reduces the yield per barrel of crude refined, the refiners should defer producing higher octane gasoline until the supply and demand relationship of the industry is in balance.

Long-Term Outlook Good, Knight Says

THE North American Gasoline Tax Conference, meeting in St. Petersburg, Fla., was told by E. T. Knight, economist with Atlantic Refining Co., that while there might be tight conditions in the short-term future in the supply of petroleum products, for the long term, in an over-all way there should be no problem of supply.

He reviewed the efforts of the industry to find new oil reserves, the large scale expansion of transportation facilities that will definitely be constructed as fast as materials are available, the present and future planned refinery capacity, and the increases in future demand which the industry is gearing its facilities to meet.

Knight stated that while it was obvious that spot shortages of some petroleum products are now being experienced, he believed the situation would be met without extended periods of lack of supplies, and that conditions will not be as tight 6 months from now, after some of the critical transportation problems are relieved. In the intervening period, the industry will be fortunate if it can get through the winter without some hardships on the part of the consumers.

He stated, however, that although methods which can to some extent relieve the situation are costly, they are being employed by the industry, which is extending itself to the limit to make the needed goods available to the public.

Reviewing the past efforts of the industry, Knight told the Tax Conference group that the industry had met nearly all of the 1947 demands, although for all products this represented an increase of 35 per cent over the prewar 1941. It had done this in spite of the inability to expand its facilities during the war.

Moreover, he pointed out, proven crude-oil reserves were at an all-time high, although the industry had been compelled to drill, on an average, 20 per cent fewer wells during the 1942-46 period than it drilled in the preceding 5-year period.

Citing the industry's search for new reserves, Knight mentioned that geophysical parties operating in the Mid-Continent and Gulf Coast areas in December 1946 numbered 443, against only 270 in April 1941. During the last 3 years, 1944 through 1946, the annual rate of exploratory drilling was more than double that of the 1938 through 1940 prewar period, and the percentage of successes was 18 per cent in the latter period as compared to 11 per cent in the prewar years.

New crude-unit foundations of Ohio Oil's new expansion move. Main laboratory structure in background

Ohio Oil Inaugurates Refinery Expansion Program on Anniversary

by R. E. Luton

THE OHIO OIL CO., which is celebrating its sixtieth year of successful operation, recently inaugurated a program of expansion and improvement that will greatly increase the present capacity of its principal refinery at Robinson, Ill. This program will include the installation of the newest type of fluid catalytic cracking unit.

The refinery now operates on Illinois crude and has a rated capacity of 15,000 bbl. per day. A constantly increasing demand for the company's products necessitated the installation of additional facilities. Present processes include atmospheric and vacuum crude distillation, thermal cracking and reforming, gas recovery, and U.O.P. catalytic polymerization. Blending and packaging of lubricating oils are also carried out. Products are gasoline, kerosine, diesel fuel, distillate and residual fuel oils, road oils, and asphalts.

Universal Oil Products Co. will design and engineer the new units. The general contractor is Arthur G. McKee & Co. J. F. Pritchard & Co. is constructing some of the off-site utilities, such as the water-supply system, interconnecting piping, and power lines that are needed to serve the new units.

Ray E. Luton is manager of refineries for The Ohio Oil Co. He joined the company in 1924 as assistant superintendent and chemist at the Robinson, Ill., refinery. He was named general superintendent of refineries in 1935 and remained in that capacity until his new duties were created early in 1947 in a revamping program within the refining and marketing division.

The new facilities will include: a two-stage crude distillation unit of special design; a fluid catalytic cracking unit; a gas-recovery plant; a U.O.P. catalytic polymerization unit; and a treating plant for gasoline.

Latest Design in Crude Unit

General design and equipment used on the crude distillation plant represent the newest developments. The unit is designed for a capacity of 27,500 bbl. of Illinois crude per day and includes facilities for atmospheric distillation, vacuum distillation, and oxidizing, or airblowing, of asphalt. The crude oil will pass a desalting unit before entering the atmospheric column.

The following fractions may be taken off the atmospheric side:

	Bbl. per stream day
300° F. e.p. stabilized straightrun gasoline	4,400
300°-400° F. e.p. naphtha	3,575
500°-530° F. e.p. kerosine	2,750
625° F. diesel fuel	2,750
Gas oil	2,750

The light straightrun gasoline end point may be varied from 250° to 350° F. and that of the naphtha from 400° to 450- F.

Bottoms from the atmospheric side will be pumped into the vacuum column, where the following cuts may be taken off:

	Bbl. per stream day
Vacuum gas oil	7,370
Penetration asphalt	3,130

The bottoms from the vacuum column may be used as flux or road oil, or they may be passed through the continuous oxidizer to produce asphalt of any desired penetration test, according to market requirements. Continuous oxidation of asphalt is

employed because a cleaner and more economical operation is thereby realized. To guard against corrosion, the top section of the atmospheric column is lined with Monel; the remainder of this column, the entire gasoline fractionating column, and the vacuum column are lined with 11-13 per cent chrome alloy.

New Fluid Catalytic Cracker

A new fluid catalytic cracking unit, embodying the U.O.P. features of advanced design, will process Illinois gas oil either on a high conversion recycle basis of 7,500 bbl. per stream day of charging stock or on a moderate conversion once-through basis of 12,400 bbl. per stream day of charging stock. Either natural catalysts or synthetic catalysts of the ground or microspherical type may be used.

In this improved design, placing the regenerator below the reactor permits (1) reducing the size of the regenerator for a given capacity, (2) marked reduction in length and diameter of catalyst transfer lines, (3) dense phase catalyst transfer from the reactor to the regenerator, and (4) a short regeneration air line to the regenerator.

Catalyst-recovery system consists of three stages of cyclones on the regenerator. The electrical precipitator used on earlier units for the recovery of catalyst fines is omitted.

Reactor design includes dense-phase horizontal grids, in addition to the main distribution grid, for reducing catalyst recycling in order to prevent further cracking of cracked products, and to insure maximum gasoline recovery. Internal and external strippers are provided in the reactor for two-stage spent catalyst stripping. The reactor, external stripper, and main fractionating column are protected from the action of corrosive stocks by use of 11-13 per cent chrome alloy steel vessel lining.

Auxiliary equipment for the catalytic cracking unit includes a pressured slurry settler, fired charge heater, steam superheater for the high-pressure steam from the flue-gas steam generator and the main fractionator steam generators, gas-engine-driven gas compressors, and condensing turbo-blower. Special provision is made for minimizing erosion of the pressure-control valve on the regenerator outlet and for silencing at the regenerator flue gas exhaust.

Pumps have been provided with spares, and pump drives are arranged to permit flexibility in balancing the steam and electric power loads. The large pumps have condensing turbine drives.

Detailed precautions have been exercised to minimize fire hazard; one feature is the installation of a permanent water fog spray system in the reactor-regenerator structure. Inspection and maintenance are facilitated by trolleys, hoists, platforms, and roadways which make all equipment easily accessible.

Gas-Recovery System

The light-gas recovery system has been designed to recover approximately 70 per cent of the propane-propylene and 95 per cent of the butane-butylene produced in the thermal and catalytic cracking operations. Products will be separate streams of debutanized gasoline from the reformers, thermal crackers, fluid catalytic cracker, and liquid C_3-C_4 polymerization unit feed.

The present gas-recovery equipment consists of a high-pressure absorber, a debutanizer for the reformed gasoline, and a debutanizer for the cracked gasoline. The gases from the thermal cracker and reformer are combined and sent to a high-pressure packed absorber, using reformer naphtha charge as lean oil.

The liquid from the reformer and thermal cracker receivers is sent to individual debutanizers, the bottom products thus being separate streams of debutanized thermally cracked and reformed gasoline. Overhead streams from each debutanizer are condensed and sent directly to the polymerization feed pretreatment. A Girbotol treating unit is being installed to remove hydrogen sulfide from the charge to the polymerization unit. Following this operation the charge will be subjected to separate caustic and water washes for final removal of small quantities of sulfur and nitrogen compounds. Sulfur compounds affect the lead susceptibility of the polymer, and nitrogen compounds are detrimental to the life of the polymerization catalyst.

The vent gases from the debutanizers are combined with the main receiver gases and are sent to the absorber of the thermal units.

New facilities will be provided for the recovery of the fluid catalytic cracking unit gas. The new unit will consist of two stages of compression, a high-pressure absorber, and a debutanizer.

The main lean-oil stream for the high-pressure absorber will be made up of the liquid from the interstage receiver of the compressor system and the liquid from the low-pressure catalytic cracking receiver. A sponge stream of 400° F. end-point catalytically cracked naphtha from the main column will be charged over the top of the absorber to increase the recovery of butane and pentane. Debutanizer bottoms will be recycled over the main column as an additional absorption medium.

Fat oil from the absorber will be debutanized in the cracked gasoline debutanizer. The overhead will be combined with thermal unit stabilizer overheads and sent to the polymerization feed pretreatment unit. Vent gas from the debutanizer receiver will be combined with the second-stage compressor gas as rich gas to the absorber. A common hot-oil recirculating system is provided for reboiling all three debutanizers.

Catalytic Polymerization Unit

The polymerization unit has been designed for production of 1,500 bbl. a day of high-octane, polymer gasoline from 3,800 bbl. a day of charge stock. This charge stock will consist of debutanizer overhead from catalytic cracking, thermal cracking, and thermal reforming gas-recovery units.

After being pretreated, the charge stock will be polymerized in high-pressure shell-and-tube-type reactors. The temperature of the catalytic reaction is controlled by boiling water around the catalyst tubes, thereby removing the heat of reaction. The generated steam preheats the feed stock. After pressure reduction, the reactor effluent flows to the depropanizer where the lighter hydrocarbons are separated and charged to the ethane column for L.P.G. production. The lightest hydrocarbons are utilized for fuel.

High-vapor-pressure polymer from the bottom of the depropanizer flows to the debutanizer where polymer and excess butanes are separated.

Gasoline Treating Plant

The straightrun-gasoline treating unit is designed to handle either low-end-point or full-range gasoline. It consists of a single-stage caustic washer, continuous flow on the gasoline, and batch on the caustic.

Five new caustic storage tanks are being provided and two new caustic transfer pumps are being installed.

The catalytically cracked gasoline will receive a two-stage caustic wash. Main function of this treater is to remove phenols from the catalytic gasoline and, by operating the units so that caustic will flow countercurrent to the gasoline, it is estimated that the phenol content of the caustic in the first stage can be built up to 25-30 per cent before the caustic must be discarded. Provision has been made in the catalytic gasoline treating area for the future installation of another caustic washer and water wash, which may be used if a market for sodium phenolate of the order of 40 per cent concentration is obtained.

In order to insure stability of the cracked and polymer gasolines, equipment is provided for the immediate injection of inhibitor at each of the plants. To insure accurate control, the inhibitor measuring drums are mounted on indicating and recording scales. The actual injection of inhibitor will be done by Proportioneers equipment. The polymer gasoline will be inhibited continuously on its way to storage.

Ground was broken for the new construction last March and the new installations are expected to be in operation in the summer of 1948.

PLANT PRACTICES

Fan Guard at Recycling Plant

TO permit visual inspection of the draft fans on the cooling tower, one recycling plant specified the use of wire-mesh tops of the draft tubes, instead of the usual housing of sheet metal or plywood. With the open tops, it is possible for the engineer to check fan operation without risk to himself, and thus to discover lack of balance or other operating difficulty, which, if unchecked, might wreck the fan. The height of the wire mesh screen makes it impossible for a person, standing on the tower platform, to reach the blades, and thus prevents injury to trespassers as well as protecting plant personnel.

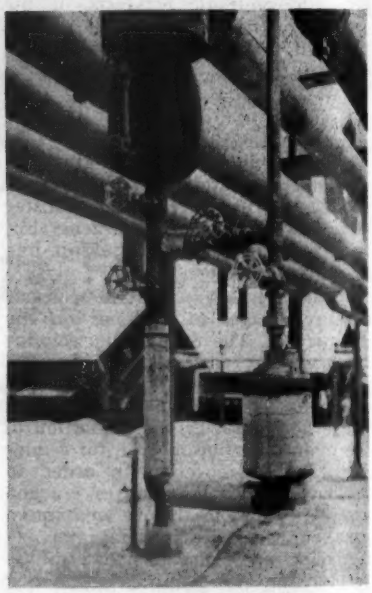
Gasoline-Powered Scooters Find Uses at Refinery

A LARGE refinery like the Wood River plant of Standard Oil Co. (Ind.) covers a wide area, and the task of supervisory personnel called to cover widely separated operations, in getting to and from these positions, becomes a time-consuming and generally a very tiring one. To overcome this difficulty, the popular gasoline scooter is being used with very good success. A total of 22 scooters are in use, adapted for different services. Of this number six are the three-wheeled, stake-bodied type, the body being placed in front for light loads such as tools, electrical equipment, or small groups of workmen, to be carried to distant points in the plant. Four scooters are of the side-car type, used also for carrying other workmen (one) or small tools or equipment. A dozen two-wheeled scooters are used almost entirely by supervisory personnel, called on to deal with widely separated units and who carry little if any equipment.

Steam Trap Mounting

WHERE long lines are required to carry steam from the boilers to the points of use around the plant, traps along the line are necessary to remove condensation before it can accumulate to form slugs which might damage valves or engines. Even when a long line is thoroughly insulated, the amount of condensate formed is considerable.

One plant unitizes the trap mounting with a bypass cut in above the trap to permit manual control of condensate removal while traps are being serviced or changed. Valves cut into the vertical inlet and discharge lines above the unions permit the



trap unit to be changed with a minimum of lost time, while an accumulator on the drop line from the steam main, equipped with sight glass, holds condensation for intermittent flow to the return line by hand operation of the line in the bypass. A fourth valve, just below the accumulator, serves to cut off the entire system for replacement or reconditioning of the valves below that point.

Factors Affecting Measured Apparent Formation Resistivities

by Sylvain J. Pirson*

FACTORS which influence the departure of apparent resistivity from true resistivity are: the presence of well fluid of resistivity ρ_m, the presence of a possible well-fluid-invaded zone of resistivity ρ_1, the electrode configuration, and the formation thickness.

Let us first study the effect of the relative electrode spacing to formation thickness. From the start, it may be stated that a complete mathematical solution of the problem is extremely complicated, hence impractical, and is beyond the scope of this paper. However, it is of interest to have a means of predicting the shape of a resistivity curve from a knowledge of the electrode configuration and formation thicknesses.

Simplified Resistivity Theory Applied to Well Logging

To predict the shape of the apparent resistivity curves, which are those measured in actual practices, we must establish the **theory of potential distribution in a stratified medium.** For simplicity, the geologic formations will be assumed to be isotropic, i.e., they have the same electrical resistivity in all directions.

Let us consider, in Fig. 1, two conductive media of resistivity ρ_1 and ρ_2 of infinite extent and in contact along a plane of surface **ab.** A current of intensity I is introduced at point A in the medium of resistivity ρ_1 and it is desired to find the potential V at any point P due to the current source.

The theory of electrical images provides a solution for this problem. This consists in substituting for the heterogeneous medium, another one but homogeneous in character through the use of a fictitious electric source of such location and intensity that it will not disturb the equilibrium conditions previously postulated. These are the **boundary conditions,** namely that at any point on the boundary common to both media the electric potential must be single valued and the current density, resulting from the source, must be of the same on both sides of the plane of separation. These are expressed at any point B along the boundary by the following equations:

$$V_1 = V_2 \qquad (1)$$

$$\frac{1}{\rho_1}\frac{\partial V_1}{\partial n} = \frac{1}{\rho_2}\frac{\partial V_2}{\partial n} \qquad (2)$$

where n is the normal to the boundary. We postulate that we can replace the two media by a single one of resistivity ρ provided we place at the image A′ an imaginary sink I′ or a source I″ at A as the case may be, the value of which depends upon the resistivity contrast between the two formations. We have the following relations on the boundary:

$$r_1 = r_2 \qquad (3)$$

$$\frac{\partial r_1}{\partial n} = -\frac{\partial r_2}{\partial n} \qquad (4)$$

The potentials V_1 and V_2 at point B on the boundary, within their respective media, are:

$$V_1 = \frac{I}{r_1} + \frac{I'}{r_2} \qquad (5)$$

in medium I now considered as infinite in all directions and of resistivity ρ_1:

$$V_2 = \frac{I''}{r_2} \qquad (6)$$

in medium II, considered infinite in all directions and of resistivity ρ_2.

Boundary condition (1) becomes:

$$\frac{I}{r_1} + \frac{I'}{r_2} = \frac{I''}{r_1}$$

from which we derive immediately:

$$I + I' = I'' \qquad (7)$$

and from 2:

$$\frac{1}{\rho_1}\frac{\partial}{\partial n}\left(\frac{I}{r_1} + \frac{I'}{r_2}\right) = \frac{1}{\rho_2}\cdot\frac{\partial}{\partial n}\left(\frac{I''}{r_1}\right)$$

or

$$\frac{1}{\rho_1}\left(-\frac{I}{r_1^2}\cdot\frac{\partial r_1}{\partial n} - \frac{I'}{r_2^2}\cdot\frac{\partial r_2}{\partial n}\right) = -\frac{I''}{\rho_2}\cdot\frac{1}{r_1^2}\cdot\frac{\partial r_1}{\partial n}$$

By virtue of Equation 2, we have:

$$\frac{1}{\rho_1}(I - I') = \frac{1}{\rho_2}I'' \qquad (8)$$

from which we derive immediately:

$$I' = \frac{\rho_2 - \rho_1}{\rho_1 + \rho_2}I \qquad (9)$$

$$I'' = \frac{2\rho_2}{\rho_1 + \rho_2}I \qquad (10)$$

which indicates we can picture the original heterogeneous conditions in two manners:

First: By means of a homogeneous medium of resistivity ρ_1 and a source I at A and its image $I' = \frac{\rho_2 - \rho_1}{\rho_1 + \rho_2}I$ at A′.

Second: By means of a homogeneous medium of resistivity ρ_1 and a source $I'' = \frac{2\rho_2}{\rho_1 + \rho_2}I$ at A′.

The simple theory of images will facilitate greatly the calculation of

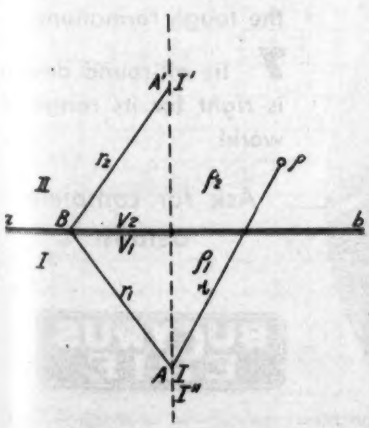
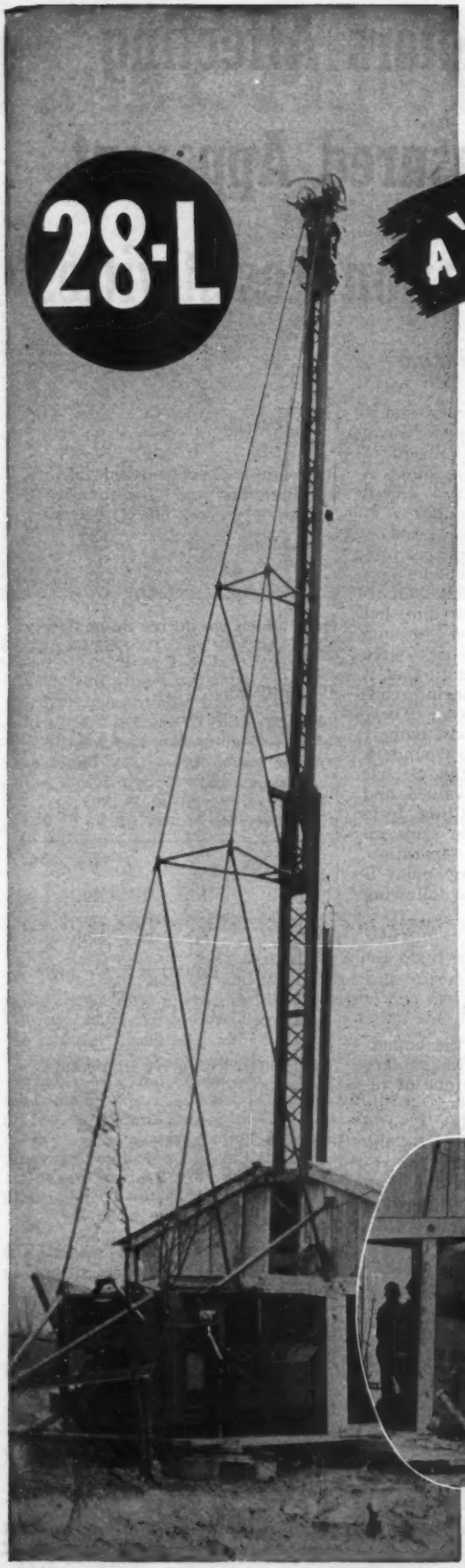


Fig. 1—Method of calculation of potential distribution in stratified rocks

*Head of division of geophysics and geochemistry, Pennsylvania State College.



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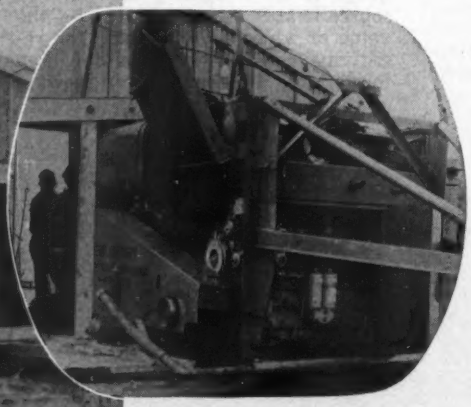

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the apparent resistivity curves for all types of electrode systems.

Apparent resistivity for two-electrode systems.—Let us consider the case represented in Fig. 2 of two infinitely thick media of resistivity ρ_1 and ρ_2 in contact along a plane surface **ab**. A current of intensity I is

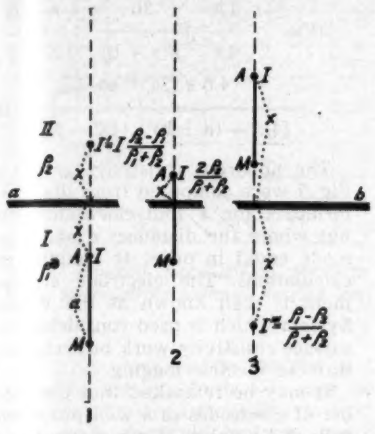


Fig. 2—Three possible positions of a two-electrode probe with respect to a plane of stratification

introduced at A and the return electrode is at the surface of the ground sufficiently far removed for its effect on pickup electrode M to be negligible. The other pickup electrode is also at the surface of the earth and its potential is considered to be zero. Hence, we need only calculate the potential effect of electrode A on M, in order to obtain the apparent resistivity curve that will be measured by this system. It will be assumed that current I is maintained constant throughout the logging procedure. Three cases are possible as follows:

1. Both electrodes A and M in medium I.
2. One electrode in each medium.
3. Both electrodes in medium II.

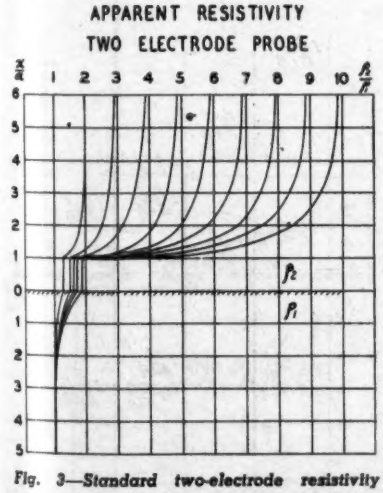


Fig. 3—Standard two-electrode resistivity curves, for resistivity contrasts varying from 1 to 10

To calculate the potential at M in case 1, we consider image I′ of intensity $I\,\frac{\rho_2-\rho_1}{\rho_1+\rho_2}$ at a distance x from the boundary. The medium is now all of resistivity ρ_1 and the potential M is given by:

$$V_{M_1} = \frac{\rho_1 I}{4\pi}\left(\frac{1}{a} + \frac{\rho_2-\rho_1}{\rho_1+\rho_2}\cdot\frac{1}{2x+a}\right) \quad (11)$$

In case 2, we need only consider the single source A of intensity $I\,\frac{2\rho_2}{\rho_1+\rho_2}$ in a medium of resistivity ρ_1. Hence:

$$V_{M_2} = \frac{\rho_1 I}{4\pi}\cdot\left(\frac{2\rho_2}{\rho_1+\rho_2}\right) \quad (12)$$

In case 3, we consider image I‴ of intensity $I\,\frac{\rho_1-\rho_2}{\rho_1+\rho_2}$ with all sources in a medium of resistivity ρ_2. Hence:

$$V_{M_3} = \frac{\rho_2 I}{4\pi}\left(\frac{1}{a} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{1}{2x-a}\right) \quad (13)$$

Formulas 11, 12, and 13 permit the calculation of the resistivity curves for the assumed conditions and for various ratios of ρ_1/ρ_2 as shown in Fig. 3.

Apparent resistivity for three-electrode systems.—Let us consider the case represented in Fig. 4 in which a system of three electrodes (AMN) logs two infinitely thick media of resistivity ρ_1 and ρ_2. A current of intensity I, maintained constant throughout the logging, is introduced at A while the return electrode is located at the surface of the earth. Two pickup electrodes M and N register the potential variations due to current I. The theory of electrical images permits again the prediction of the shape of the resistivity curve for the case at hand. There will now be four possible cases for the location of the electrodes with respect to the boundary:

Fig. 4—Four possible positions for a three-electrode probe with respect to a plane of stratification

Case 1.—All three electrodes are in medium I of resistivity ρ_1. We consider the image A′ of the intensity $I\,\frac{\rho_2-\rho_1}{\rho_1+\rho_2}$ at a distance x from the boundary. With the introduction of the image A′, everything behaves as if we had a full infinite medium of resistivity, ρ_1 and the potentials at M and N are obtained from:

$$V_M = \frac{\rho_1 I}{4\pi}\left(\frac{1}{a} + \frac{\rho_2-\rho_1}{\rho_1+\rho_2}\cdot\frac{1}{2x+a}\right) \quad (14)$$

$$V_N = \frac{\rho_1 I}{4\pi}\left(\frac{1}{a+b} + \frac{\rho_2-\rho_1}{\rho_1+\rho_2}\cdot\frac{1}{2x+a+b}\right) \quad (15)$$

Hence, the potential difference registered between M and N is obtained by:

$$\Delta V_{MN} = V_M - V_N = \frac{\rho_1 I}{4\pi}\left[\frac{b}{a(a+b)} + \frac{\rho_2-\rho_1}{\rho_1+\rho_2}\cdot\frac{b}{(2x+a)(2x+a+b)}\right] \quad (16)$$

Case 2.—The current electrode is now in medium II and both potential electrodes are in medium I. The problem may be solved by considering a single current source at A of intensity $I\,\frac{2\rho_2}{\rho_1+\rho_2}$ in a full infinite medium of resistivity ρ_1.

$$\Delta V_{MN} = V_M - V_N = \frac{\rho_1}{4\pi}\cdot\frac{I\rho_2}{\rho_1+\rho_2}\left[\frac{b}{a(a+b)}\right] \quad (17)$$

Case 3.—The current electrode and one potential electrode M are now in medium II whereas electrode N is in medium I. This problem may be treated as a combination of the two-electrode's cases 2 and 3. We have immediately:

$$V_M = \frac{\rho_2 I}{4\pi}\left(\frac{1}{a} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{1}{2x-a}\right) \quad (18)$$

$$V_N = \frac{\rho_2 I}{4\pi}\cdot\frac{2\rho_1}{\rho_1+\rho_2}\cdot\frac{1}{a+b} \quad (19)$$

Hence:

$$\Delta V_{MN} = V_M - V_N = \frac{\rho_2 I}{4\pi}\left(\frac{1}{a} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{1}{2x-a} - \frac{2\rho_1}{\rho_1+\rho_2}\cdot\frac{1}{a+b}\right) \quad (20)$$

Case 4.—All three electrodes are now in medium II. We consider image A′ of intensity $I\,\frac{\rho_1-\rho_2}{\rho_1+\rho_2}$ below the

boundary with all sources in a medium of resistivity ρ_2. We have:

$$V_M = \frac{\rho_2 I}{4\pi}\left(\frac{1}{a} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{1}{2x-a}\right) \quad (21)$$

$$V_N = \frac{\rho_2 I}{4\pi}\left(\frac{1}{a+b} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{1}{2x-a-b}\right) \quad (22)$$

Hence:

$$\Delta V_{MN} = V_M - V_N = \frac{\rho_2 I}{4\pi}\left[\frac{b}{a(a+b)} - \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{b}{(2x-a)(2x-a-b)}\right] \quad (23)$$

Apparent resistivity curves were computed from above equations for a standard three electrode logging system of dimensions AM = 16″, MN = 9″ which is one of the short lateral investigating probe. The results are plotted on Fig. 5. One should bear in mind that the above formulas and curves are also valid for three-electrode systems using two current electrodes and one pickup electrode. This is by virtue of the **reciprocity theorem** according to which one may interchange current with potential electrodes and vice versa without changing the quantitative nature of the answer.

Apparent resistivity for four-electrode system. — Apparent resistivity curves for a four-electrode logging system may be obtained by a treatment similar to the above. Fig. 6 represents the five different cases of electrode locations with respect to the boundary between media 1 and II which are now possible. The intensities of the current images are also indicated. Without going into the details, the potential differences measured between M and N in each case, are as follows:

Case 1:

$$\Delta V_{MN} = \frac{I\rho_1}{4\pi}\left[\frac{2b}{a(a+b)} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{4bx(2a+b)}{[4x^2-(a+b)^2](4x^2-a^2)}\right] \quad (24)$$

Case 2:

$$\Delta V_{MN} = \frac{I\rho_1}{4\pi}\left[\frac{b}{a(a+b)}\left(\frac{2\rho_2}{\rho_1+\rho_2}+1\right) - \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{b}{(2x+a)(2x+a+b)}\right] \quad (25)$$

Case 3:

$$\Delta V_{MN} = \frac{I}{4\pi}\left[\frac{\rho_1+\rho_2}{a} + (\rho_2-\rho_1)\cdot\frac{4x}{4x^2-(a+b)^2} - \frac{4\rho_1\rho_2}{\rho_1+\rho_2}\cdot\frac{1}{a+b}\right] \quad (26)$$

Case 4:

$$\Delta V_{MN} = \frac{I\rho_2}{4\pi}\left[\frac{b}{a(a+b)}\left(1+\frac{2\rho_1}{\rho_1+\rho_2}\right) - \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{b}{(2x+a)(2x+a+b)}\right] \quad (27)$$

Case 5:

$$\Delta V_{MN} = \frac{I\rho_2}{4\pi}\left[\frac{2b}{a(a+b)} + \frac{\rho_1-\rho_2}{\rho_1+\rho_2}\cdot\frac{4bx(2a+b)}{[4x^2-(a+b)^2](4x^2-a^2)}\right] \quad (28)$$

The apparent resistivity graphs of Fig. 7 were computed from the above formulas for a four-electrode probe but where the distances **a** and **b** are made equal in order to simplify the calculations. The electrode arrangement is then known as the **Wenner System** which is used considerably in surface resistivity work but relatively little in electric logging.

It may be remarked that the number of electrodes in a well probe controls the number of discontinuities in the resistivity curve corresponding to a single boundary. One may notice two discontinuities for the two-electrode systems, three for the three-electrode system, etc. This, of course, is as it should be for each time an electrode crosses the boundary there should be a sharp redistribution of current as well as potential. Hence, this provides a clue to the type of electrode system used in logging if such is not indicated on the log heading, provided one can find at least one clean and sharp geologic discontinuity between beds relatively thick with respect to the electrode spacing. By a comparison with the theoretical resistivity curves, an idea of the dimensions of the probe may also be derived as well as the distances between electrodes.

The preceding theory made a sweeping assumption namely, that the formation thicknesses could be consid-

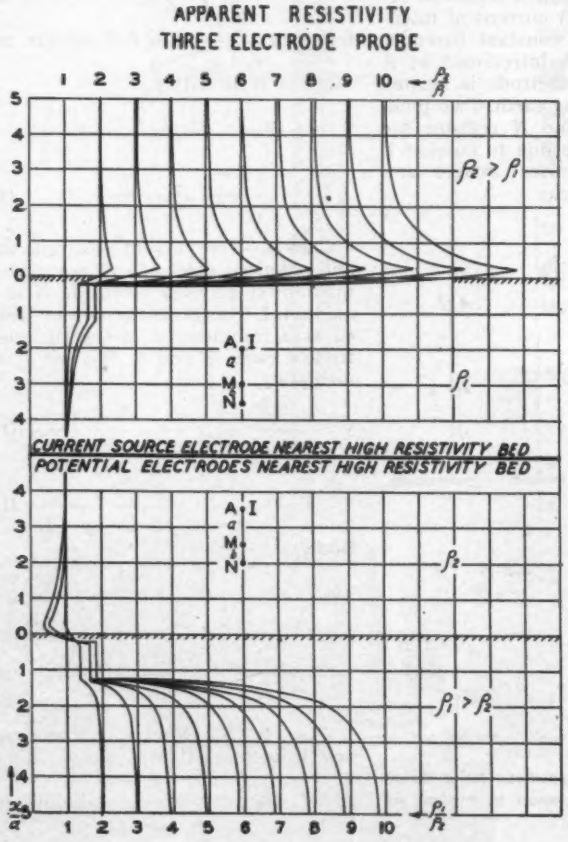


Fig. 5—(Left) Standard three-electrode resistivity curves for resistivity contrasts varying from 1 to 10. Shapes of the standard curves vary depending upon the approach to the boundary

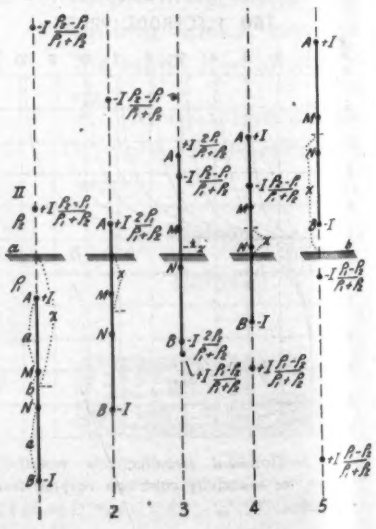


Fig. 6—(Right) Five possible positions for a four-electrode probe with respect to a plane of stratification

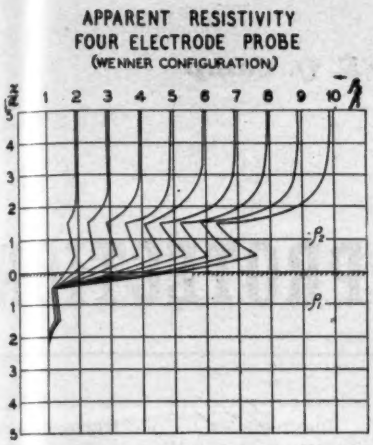


Fig. 7—Standard four-electrode resistivity curves for resistivity contrasts varying from 1 to 10

ered large compared to the size and electrode spacing. In fact it may be seen that the true resistivity is read with most electrode systems where the formations are four to five times larger than the spacing. For formation thicknesses below these figures, the effect of the lower and upper boundaries start to interfere and for very small formation thicknesses with respect to electrode spacing a large aberration may be had. Theoretically, the mathematical derivations of apparent resistivity curves for any assumed number of boundaries are still possible but they become too hopelessly complicated to be practical. It is necessary to resort to some simplifying assumptions in order to derive the true resistivity from the apparent resistivity curves.

One simplifying assumption which can be made is that **resistivity curves due to two neighboring boundaries are additives.** This principle will be illustrated by means of an example represented on Fig. 8. Let two boundaries **ab** and **cd** separate media 1, II, and III of resistivities 9 $\rho_1 = \rho_3$ and $\rho_2 = 2\rho_1$, and where the thickness of formation II is equal to three times the electrode spacing in a two-electrode system.

The apparent resistivity curve (1234) is obtained from the graphs of Fig. 3 using a resistivity ratio of $\rho_1/\rho_2 = 9/1$ whereas apparent resistivity curve (1'2'3'4') is obtained from the same graphs by interpolation between resistivity ratios of 4 and 5 in order to obtain the curve corresponding to $\rho_2/\rho_1 = 9/2 = 4.5$. A judicious rounding of the curves near their meeting point is resorted to, in an empirical manner. This synthesizing process of the apparent resistivity curve gives us a clue to a method of interpretation and solution of the true resistivity. Assuming that we know the electrode spacing, the formation thicknesses as observed from the self-potential curve, and that we are well supplied with standard theoretical resistivity curves such as those of Figs. 3, 5, and 7, we try to fit the resistivity curve from both sides using the shale resistivity as the base line.

An example will again illustrate the method. Part of an actual log will be used for this purpose; it is illustrated in Fig. 8. The self-potential curve gives us the thickness of the formation, namely 105 ft. The probing system used in a three-electrode probe with spacing AO = 24 ft. or distance between the center of the current electrodes and pickup electrode. The distance between current electrodes is 9 ft. For simplicity we assume the well fluid-formation resistivity contrast to have no effect and that mud invasion is nonexistent.

The standard three-electrode resistivity curves expanded to fit the scale

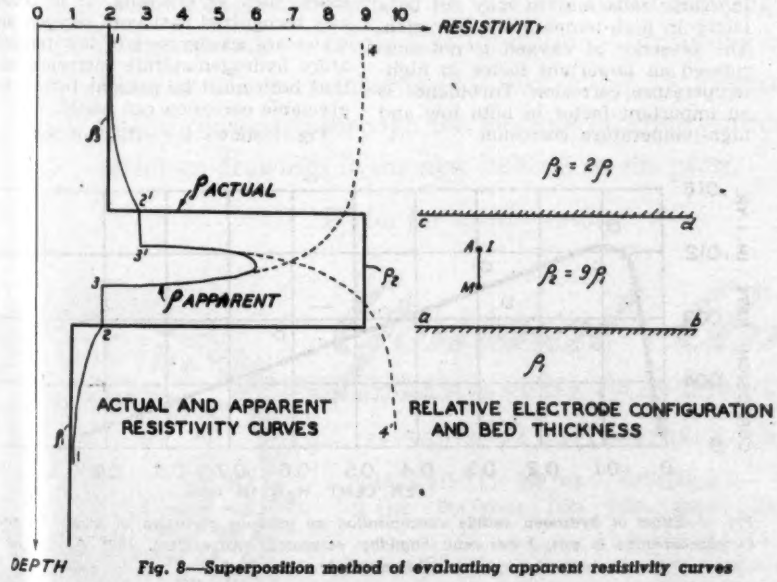


Fig. 8—Superposition method of evaluating apparent resistivity curves

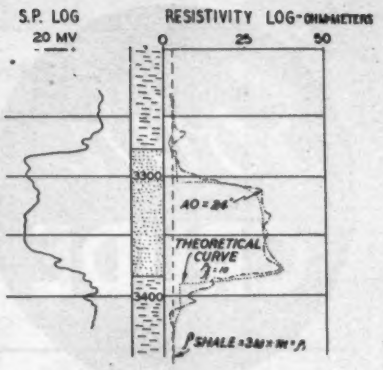


Fig. 9—Superposition method of solving for true resistivity

of the log are traced on a transparent sheet of paper and superposed over the resistivity curve, lining up the shale base line with the standard base line. The standard curves that fit both sides of the log are determined. In this case the lower standard curve that fits the data is for a resistivity ratio 10 and it can be verified that the upper standard curve that fits the data is also for a resistivity ratio of 10. Since the shale resistivity is 3 ohm × meters the resistivity of the formation is $3 \times \frac{10 + 10}{2} = 30$ ohm × meters. The true desistivity determined by another method, (Resistivity Departure Curve Method) which allows for the size of the hole and mud resistivity indicates a resistivity of 29 ohm × meters. It is inferred that the standard curve-fitting method is thus a rapid procedure to obtain a first approximation to the true resistivity of a formation electrically logged.

The simplified interpretation theory so far studied has made other simplifying assumptions besides that of the additive character of boundary interferences, namely: the negligible effect of bore hole size well mud and formation invasion. In order to take these factors into account it is necessary to involve a fairly laborious procedure which nevertheless has been greatly simplified through the use of the **resistivity departure curve method**[1] proposed by Schlumberger Well Surveying Corp. It is beyond the scope of this paper to review this method which is fully explained in a pamphlet obtainable from the above-named corporation. The proper use of these curves with examples was also explained in a recent A.P.I. paper.[2] The resistivity - departure - curve method applies only to relatively thick beds compared to electrode separation. As a general rule the ratio of these two dimensions should be at least four.

For estimating the true resistivity of thin beds we have as yet but approximation methods, the simplified mathematical theory explained above

(Continued on page 87)

Sour CRUDE EQUIPMENT PROTECTION

by E. Q. Camp

CORROSION is one of the major problems confronting the designer and operator of refinery equipment. It has been estimated that the losses due to corrosion in the refining industry alone are equivalent to approximately 1 cent per gallon of gasoline produced.[1] . . .

Corrosion problems peculiar to the refining industry are primarily those which arise as a result of the presence of corrosive sulfur compounds and of chlorides of magnesium and calcium in the crude oils. The major offenders in this respect are the high-sulfur crudes, frequently referred to as sour crudes, which include West Texas and Panhandle.

This paper presents a discussion of the major corrosion problems experienced in processing sour crudes at the Baytown refinery of Humble Oil & Refining Co., and of the methods employed in mitigating these corrosion problems at this refinery. This paper is limited to a discussion of the major corrosion problems experienced in processing sour crudes, because the minor problems encountered are so many that it would not be feasible to discuss them in one paper.

The corrosion experienced in processing sour crudes has been discussed in detail in a number of papers presented on this subject during the past several years.[2 to 29] Although the present paper is limited primarily to the experiences with corrosion in one refinery, and to corrosion mitigation in processing sour crudes, it is emphasized that these experiences closely parallel those in other refineries in which sour crudes are processed; and, as a result, many of the problems discussed and the solutions presented in this paper have already appeared in the literature.

Classification of Corrosion

Corrosion of refinery equipment in which sour crudes are processed may be classified, for convenience, according to temperature; i.e., the corrosion which occurs at low and high temperature.[2] Corrosion that occurs at temperatures between atmospheric and about 500° F. is usually classified as low-temperature corrosion. Corrosion that is experienced at temperatures above about 500° F. is usually classified as high-temperature corrosion. The presence of water is usually essential to low-temperature corrosion. Oxygen is another important factor in determining the extent to which refinery equipment is corroded under low-temperature conditions. Low-temperature corrosion is usually affected to an appreciable extent by the presence of inorganic salts in the water phase. Presence of water and inorganic salts may or may not be a factor in high-temperature corrosion. The presence of oxygen is not considered an important factor in high-temperature corrosion. Turbulence is an important factor in both low and high-temperature corrosion.

E. Q. Camp is senior research chemist for Humble Oil & Refining Co., Baytown, Tex. For the past 18 years he has been employed by Humble with his major efforts directed toward the solution of corrosion problems. **Paper presented at annual meeting of the A.P.I., Chicago, November 10-13. A second section, dealing with equipment protection from corrosion in "Cracking Units," will be published separately in a later installment.**

Inasmuch as the electromechanical theory is generally accepted in explanation of the mechanism of all types of corrosion, no discussion is given to the theory of the corrosion involved in processing sour crudes in this paper.

Low-Temperature Corrosion

Low-temperature corrosion encountered in processing sour crudes is primarily due to hydrogen sulfide, hydrochloric acid, water, oxygen, and carbon dioxide. Presence of water is considered necessary for any appreciable corrosion to occur in processing sour crudes at low temperature. A brief discussion of the other corrosive media involved in low-temperature corrosion of equipment involved in processing sour crudes is presented hereinafter.

1. Hydrogen-sulfide corrosion.—The severe corrosion of equipment that is caused by hydrogen sulfide in sour crudes has been discussed in detail by several investigators. Corrosion by hydrogen sulfide at low temperature prevents a somewhat different problem from the high-temperature hydrogen-sulfide corrosion that is encountered in certain refining processes, such as cracking. It is generally recognized that both oxygen and water are accelerators of low-temperature hydrogen-sulfide corrosion, and that both must be present before appreciable corrosion can occur.

Fig. 1 shows the effect of the con-

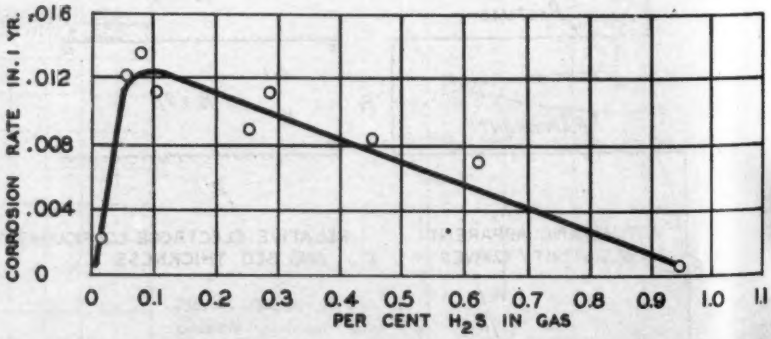
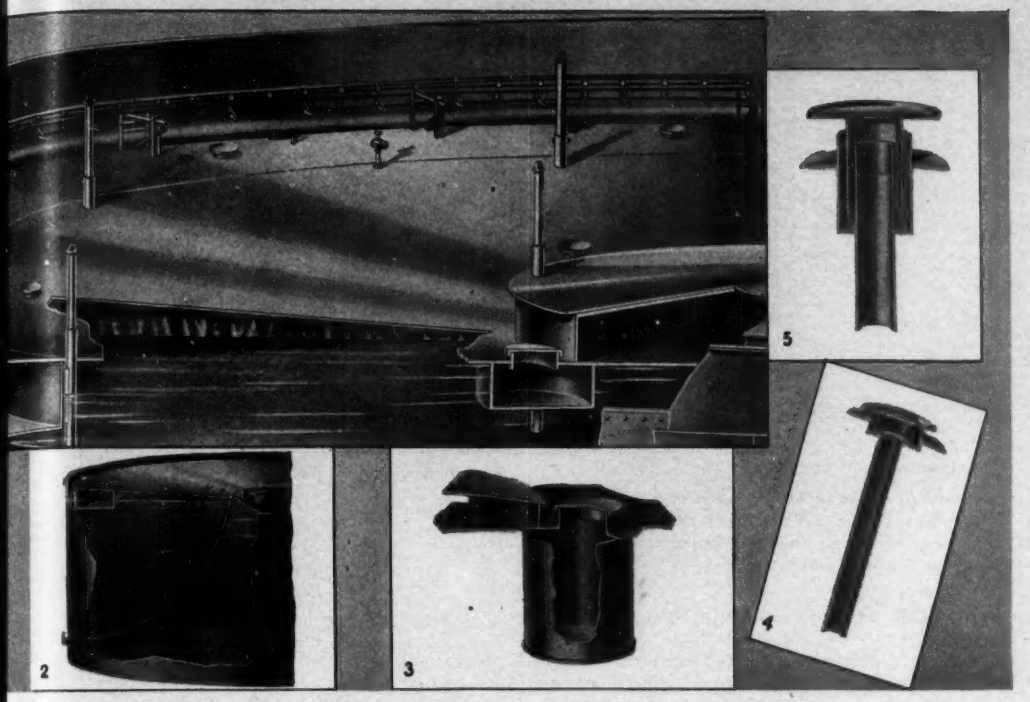


Fig. 1—Effect of hydrogen sulfide concentration on gaseous corrosion of steel. Legend: O_2 concentration in gas, 2 per cent; humidity, saturated; temperature, 100° F.; pressure, atmospheric



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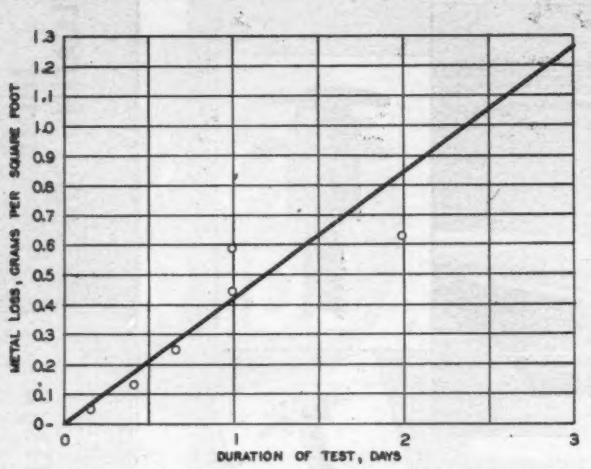

Fig. 2—Progression of gaseous hydrogen-sulfide corrosion of steel with time. Legend: H_2S concentration in gas, 0.27 per cent; O_2 concentration in gas, 2 per cent; humidity, saturated; temperature, 100° F.; pressure, atmospheric

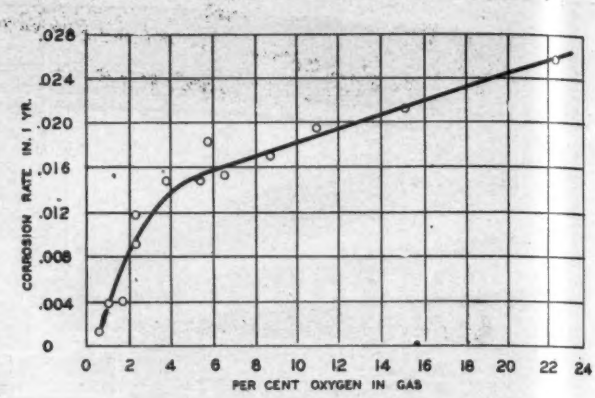

Fig. 3—Effect of oxygen on gaseous hydrogen-sulfide corrosion of steel. Legend: H_2S concentration in gas, 0.27 per cent; humidity, saturated; temperature, 100° F.; pressure, atmospheric

centration of hydrogen sulfide on the low-temperature corrosion of steel in an atmosphere of oxygen, natural gas, and water vapor.[25] It is indicated that, for a given concentration of oxygen, viz., 2 per cent, the corrosion tends to be proportional to the hydrogen-sulfide content of the gas up to a concentration of approximately 0.10 per cent. As the hydrogen-sulfide concentration of the gas is increased above about 0.10 per cent, the corrosion rate decreases with an increase in hydrogen-sulfide concentration. This is an indication that the ratio of the oxygen concentration to the hydrogen-sulfide concentration is the controlling factor in the amount of corrosion experienced.

Fig. 2 shows how low-temperature hydrogen-sulfide corrosion of steel progresses with time.[25] These data indicate that the scale formed on the steel is not protective.

2. Dissolved oxygen.—Presence of oxygen is necessary for any appreciable amount of corrosion to occur in processing sour crudes under low-temperature conditions. This applies especially to the corrosion experienced prior to the distillation step, or to other processes involving appreciable rise in temperature of the crude. The low-temperature corrosion experienced after a sour crude has been subjected to elevated temperature may be due primarily to hydrochloric acid. The presence of oxygen is not so necessary for appreciable corrosion by hydrochloric acid as it is for rapid corrosion by hydrogen sulfide.

Fig. 3 shows the effect of oxygen concentration on the rate of corrosion of steel in an atmosphere of hydrogen sulfide, water vapor, and natural gas.[25] The data presented in this graph indicate that the rate of corrosion is roughly proportional to the oxygen concentration up to approximately 5 per cent of oxygen. At higher concentrations of oxygen, the rate of corrosion increases at a relatively lower rate with increase in oxygen concentration.

3. Hydrochloric acid. — Hydrochloric acid is the most corrosive agent encountered in processing sour crudes at low temperature. This acid is formed by the hydrolysis of magnesium and calcium chlorides usually present in sour crudes. This type of corrosion, although of no particular significance in sour-crude storage tanks, charge lines, etc., constitutes a major problem after the crude has been subjected to elevated temperatures, such as those encountered in distillation, cracking, etc.

4. Carbon dioxide.—Carbon dioxide may be a factor in the low-temperature corrosion of distillation equipment in those cases in which the sour crude contains an appreciable quantity of bicarbonates. Carbon dioxide is evolved at distillation temperatures, with the result that carbonic acid is formed in the product streams when the temperature is reduced below the condensation temperature of water.

It has been demonstrated that corrosion due to carbonic acid is appreciable at a pH of 6.0; whereas corrosion by the stronger acid, such as hydrochloric, is not particularly rapid at a pH above about 4.5. This is explained on the basis that total acidity rather than pH value determine the extent to which an acid corrodes iron. Because carbonic acid is a weak acid, its pH value is higher than that of a stronger acid of equal concentration. Carbonic-acid corrosion is usually a minor factor in the corrosion involved in processing sour crudes at low temperature. In those cases in which this acid is a factor in the corrosion experienced in processing sour crudes at low temperature, the corrective measures used in the mitigation of corrosion by the stronger acids are usually applicable.

High-Temperature Corrosion

Corrosion which occurs in processing sour crudes at temperatures above about 500° F. is classified as high-temperature corrosion in this paper. Corrosion of this type is primarily due to sulfur compounds present in the crude oil. Presence of inorganic salts, particularly chlorides of calcium and magnesium, may have a marked effect upon the rate of corrosion experienced. The data presented in Table 1 show the effect of hydrogen chloride on the rate of corrosion of 18-8 alloy in reforming normal hexane at a temperature of 1,320° F. It will be observed that the corrosion rate was increased from zero to an average corrosion rate of 0.1189 in. per year by injecting anhydrous hydrogen chloride into the naphtha charge to the cracking unit.

TABLE 1—Effect of Hydrogen Chloride on Corrosion of 18-8 Alloy in Reforming Normal Hexane at 1,320° F.

Charge to unit—	Corrosion rate (In. per year)
n-Hexane	None
n-Hexane plus hydrogen-chloride gas	0.1189

Of the various sulfur compounds present in sour crudes, it is generally agreed that free sulfur, hydrogen sulfide, and mercaptans are the most corrosive under high-temperature conditions. The corrosion that occurs as a result of the presence of other sulfur compounds in sour crudes is probably due to the action of the products formed by the decomposition of the relatively non-corrosive sulfur compounds at elevated temperatures.

The data presented in Fig. 4 show the effect of temperature on the rate of corrosion of steel in processing sour crudes.[26] Temperature and turbulence are probably the most important factors in corrosion by sulfur compounds at elevated temperature, other than the concentration of the more reactive sulfur compounds themselves.

Results of previous work have indicated that naphthenic acids may be an important factor in high-temperature corrosion of steel equipment.[2] As an example, it was found that naphthenic acid in a refined oil at 650° F.

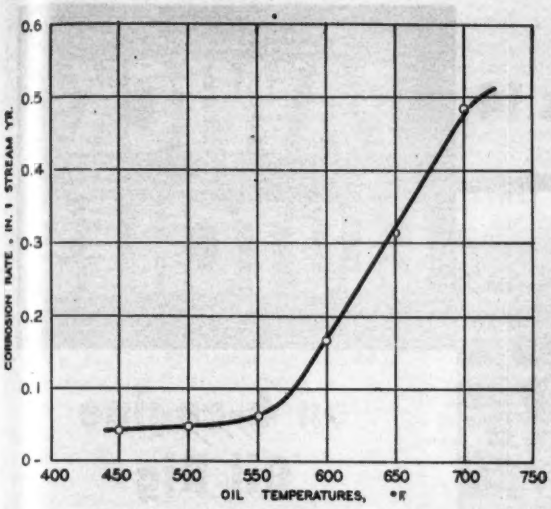

Fig. 4—Effect of temperature on corrosion of carbon steel and 4-6 Cr., ½ Mo. furnace tubes in processing sour crude from West Texas

corroded steel at a rate varying from 0.06 in. per year to 0.2 in. per year, depending primarily upon the amount of acid present.

Flow of Sour Crude Through Refinery

A simplified flow diagram showing the flow of sour crude through the refinery is presented in Fig. 5. It will be observed that the flow of a sour crude through a refinery constitutes an extremely complicated pattern. Corrosion is experienced throughout all the equipment in which the sour crude and its component parts are processed. A detailed discussion of all the corrosion experienced in processing sour crudes would be a major undertaking. For this reason, the present paper is limited to a discussion of some of the major corrosion problems encountered in storing, transporting, distilling, and cracking sour crudes and sour distillates.

Tanks

Corrosion of steel tanks in sour-crude and sour-distillate services is a problem of considerable significance in the operation of a refinery.[34] The corrosion is due to the action of hydrogen sulfide, oxygen, and water This type of corrosion was discussed in the first part of this paper.

The roof and two top rings of the shell usually suffer the most corrosion. Corrosion of the bottoms of the tanks present the next most important problem. Corrosion of the shells of the tank, other than the two top rings, present the least problem. Roofs of tanks in sour-crude service have a life varying from about 5.3 to 11.6 years, with 8.7 years being the average life. Roofs of tanks in sour-distillate service have a life from 3.8 to 14.3 years, with an average life of 7.9 years.

Means of Increasing Life of Tanks

1. Heavier steel construction.—One of the most effective low-cost methods of increasing the life of a tank is to increase the thickness of the steel plates. As an example, it is common practice to use 3/16-in. plates for tank roofs. Based upon replacing the roofs when the plates reach a minimum thickness of 1/16 in., increasing the original thickness of the plates by 1/16 in. offers an increase of 50 per cent in the life of the roof for a 33 per cent additional cost of material for the roof, or approximately a 20 per cent additional overall cost for material and labor; because, due to the longer life expected from the thicker plates, the yearly cost for installation and dismantling would, of course, be considerably reduced.

As a result of the longer relative life of the rafters and other structural supports as compared with that of a roof of normal thickness, the use of thicker roof plates would more nearly equalize the replacements of these units of equipment. The use of 5/16-in. roof material could probably be justified for use on rundown tanks and tanks of intermediate size in sour service where the previous roof lasted less than about 6 years; whereas ¼-in. material would probably be more practical on larger tanks, where increased thickness of supporting members would be a factor.

2. Roofs of aluminum and galvanized steel.—Twenty-seven aluminum roofs have been installed on rundown tanks in sour-distillate service at Baytown. The first of these roofs was installed in March 1928. All of the others were installed between February 1931, and February 1936. No corrosion has been experienced on these roofs proper, other than the formation of a thin white coating, probably of aluminum oxide. Some galvanic corrosion has been experienced at the point where the roofs are riveted to the angle irons connecting the roofs and shells of the tanks. The same type of corrosion has been experienced where the roofs contact other steel supporting members.

In December 1930, two rundown tanks were equipped with galvanized roofs. These roofs are still in good condition. The only evidence of corrosion is a white powdery material

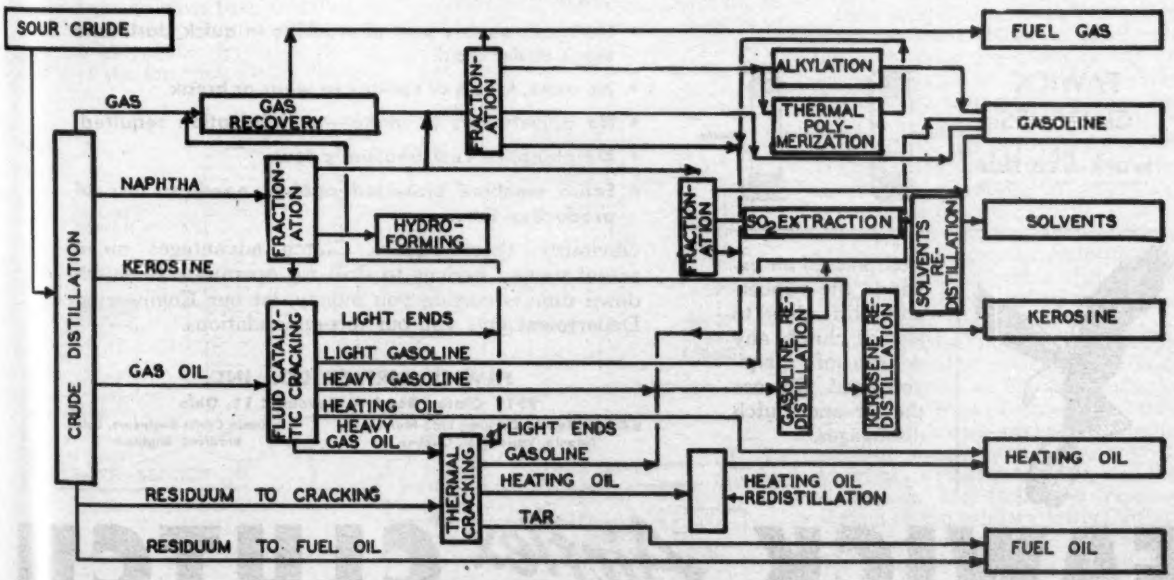

Fig. 5—Flow diagram for processing sour crudes

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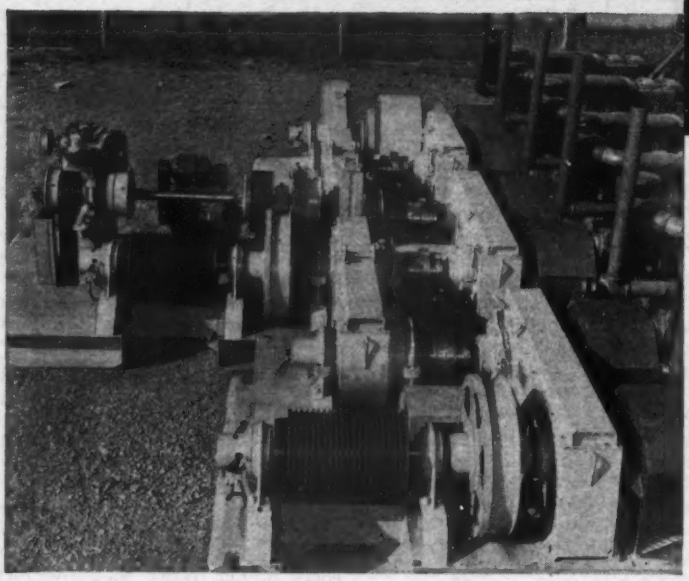

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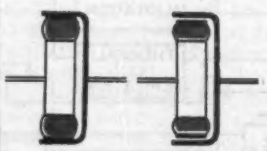

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formed on the surface of the galvanized coatings.

The present practice is to install steel roofs on rundown tanks, rather than aluminum or galvanized roofs; because the average life of steel roofs is approximately 8.2 years, and an aluminum or galvanized roof, either of which costs approximately two to three times as much, would have to give at least 16 years of uninterrupted service to pay out the added investment. Further, steel roofs can be protected at a relatively low cost. This will be discussed later under the application of gunite coatings to tank roofs and shells.

3. **Caustic washing.**—Caustic washing of distillates from sour crudes has effected an increase of 5.4 years in the average life of tank roofs in rundown and intermediate storage service. Maximum use is made of this method of increasing the life of tank roofs, because it is eventually necessary to remove hydrogen sulfide from sour distillates.

4. **Flat roofs in crude service.**—It has been observed that the roof and top rings of tanks in sour-crude service corrode more rapidly than do the shells. This difference in corrosion rate is attributed to some extent to the protective film of oil left on the shells when the tanks are emptied after having been filled. In some cases flat roofs are installed on tanks in crude service with provisions for filling the tanks and wetting the underside of the roofs once every 30 days, thereby maintaining a protective film of oil on the roof plates. This procedure has the advantage of reducing the vapor space of the tanks to a minimum, which is reported to be effective in reducing the corrosion of the roof plates.

Because of the apparent advantage to be derived from wetting the underside of the roof plates with crude oil, spray systems have been installed in some tanks whereby crude oil may be sprayed at regular intervals on the roof and the top shell plates, thereby maintaining a protective film of oil on these portions of the tanks.

It is indicated in some cases that the practice of wetting the roofs and shells of tanks with crude oil has effected an increase in the life of these portions of the tanks, but it is not conclusive at present that this type of protection is economically feasible for general application. This is due primarily to: (1) The high cost of the equipment required to spray or wet the roofs and other portions of tanks. (2) The difficulties experienced in dislodging the water film from horizontal surfaces. (3) Interruptions in pumping schedules in order to wet the roofs at intervals of 3 to 15 days, the frequency required to obtain any appreciable protection.

5. **Protective coatings.**—A wide variety of nonmetallic materials has been tested by application to sandblasted steel panels and exposure to sour vapors in crude and rundown tanks. Direct applications of those materials showing the best protection were made to the roofs of tanks in sour service. None of these materials has given satisfactory protection for as long as 2 years. It is concluded from this work that none of the protective coatings manufactured at present is sufficiently resistant to justify its application to the roofs of tanks in sour-crude and sour-distillate services. Work on this phase of the problem is being continued by the industry in cooperation with the manufacturers of protective coatings, with the hope that a coating may be developed that will give satisfactory protection in sour-crude and sour-distillate services.

6. **Gunite linings.**—Tank bottoms in sour-distillate service have been protected with concrete for about 18 years at the Baytown refinery. The first applications of concrete were made to the tank bottoms themselves, but later applications included a gunite lining extending about 18 in. up the shells of the tanks. Because of the good results obtained with coatings of this type, gunite coatings were applied to the entire shells, roofs, and structural members of several tanks. The results obtained were satisfactory, and it is now common practice to gunite the inside surfaces of essentially all tanks in rundown and intermediate sour-distillate service.

Guniting of a tank is accomplished in three separate operations. These consist of the preparation of the surface, installation of the reinforcement, and application of the gunite. The final cleaning of a tank in preparation for guniting consists of sandblasting to bare metal. It is common practice to sand-blast new tanks to remove the mill scale.

Preparation of a tank for guniting, the installation of the reinforcing, and the application of the gunite coating have been discussed in detail in the literature.[3] . . .

Cost of applying a gunite coating is in the order of 50 to 60 per cent of the cost of a new tank. The application of gunite coatings to a tank is justified on the basis that they at least double the life of the tank. Normally, it is expected that gunite linings will more than double the life of a tank. The maximum life of such coatings in sour-crude and some distillate services has not been established.

Lines

It is not general practice to protect lines in sour-crude and distillate services, although it is recognized that they are subject to all the corrosive conditions that usually affect tanks in similar services, except that possibly less air is present in the lines. However, in some isolated cases ammonia or caustic solution may be injected into distillate lines to reduce corrosion. In those cases the corrosion is usually due to an inorganic acid, such as hydrochloric acid, rather than to compounds of sulfur.

Distillation Equipment

Data presented in this paper on the corrosion encountered in fractionating sour crude are based on the experience obtained in reducing West Texas crude to about 40 per cent bottoms in a pipe still. The corrosion experienced in this particular operation parallels that experienced in other distillation operations in which sour crude constitutes the charge. It is believed, therefore, that a discussion of the corrosion experienced in this particular operation will suffice for the corrosion experienced in the distillation of sour crudes in general.

A simplified flow diagram of the pipe still used in reducing West Texas crude is shown in Fig. 6. Briefly, the charge of West Texas crude flows through a steam preheater, through naphtha vapor-to-crude and bottoms-to-crude exchangers, and is then flashed in the flash and reservoir section of the primary tower; the stabilized crude flows into the furnace. The stabilized crude is heated to a temperature of about 575° F., and

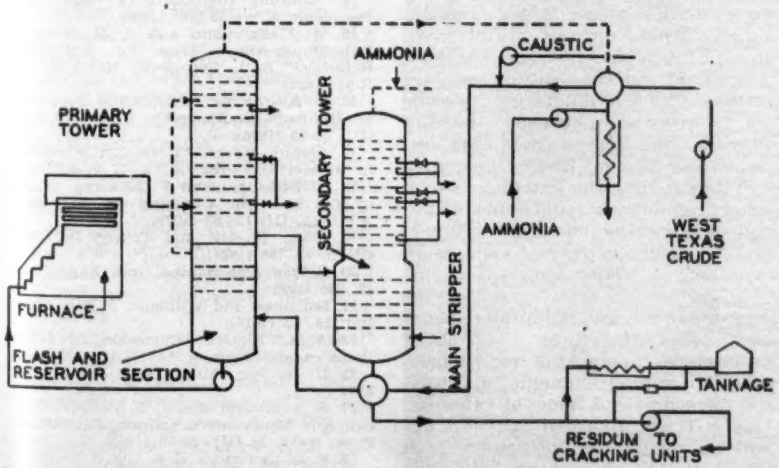

Fig. 6—Flow diagram for pipe still No. 1

flows from the furnace into the primary tower, where light naphtha is distilled overhead. The bottoms from the primary tower enter the secondary tower, where the remainder of the upper 60 per cent of the crude is removed as overhead and side streams. The bottoms from the secondary tower are pumped through the bottoms-to-crude exchangers and then into a reduced-crude cracking unit.

In the early operation of this pipe still, rapid corrosion was experienced in the furnace tubes and overhead lines and condensers. Further details of this corrosion and the methods employed in its mitigation are presented in the following discussion.

Furnace Tubes

All the original tubes in the furnace of this pipe still were of low-carbon steel. Rapid corrosion of these tubes was experienced, necessitating replacements after 4 to 6 months. First step in reducing this corrosion consisted of introducing caustic with the crude charge. It was found that caustic solution equivalent to 6 lb. of sodium hydroxide per 1,000 bbl. of crude oil could be injected with the charge without affecting the operation of the pipe still or of the residuum cracking units. This quantity of caustic reduced the corrosion of the furnace tubes, but replacements of tubes near the coil outlet was necessary after 6 to 8 months.

Larger amounts of caustic progressively reduced furnace-tube corrosion at the pipe still, but limited operations at the residuum cracking units because of the rise in tube-metal temperature of the cracking-coil furnace tubes. As a result of this, caustic solution equivalent to 6 lb. per 1,000 bbl. of charge was injected with the crude charge, and 20 steel tubes at the coil outlet were replaced with 4 to 6 per cent chromium-0.5 per cent molybdenum tubes. This combination of injecting caustic with the crude charge and using 4 to 6 per cent chromium tubes near the furnace outlet has controlled satisfactorily the corrosion of the furnace tubes on a pipe still processing West Texas crude.

The fact that the injection of caustic with the charge to the pipe still reduced the corrosion of the furnace tubes indicates that the corrosion was due in part to chlorides in the crude charge, particularly hydrochloric acid formed by the hydrolysis of calcium and magnesium chlorides at elevated temperature.

In the initial operation of this pipe still, rapid corrosion of the vapor lines and condensers was experienced. This corrosion was due to hydrochloric acid formed as a result of the hydrolysis of calcium and magnesium chlorides present in the crude charge. Injection of caustic with the crude charge effected a marked reduction in the amount of hydrochloric acid evolved, but did not eliminate it. The vapor lines are of low-carbon steel, the naphtha-vapor-to-crude exchanger contains admiralty-metal tubes in a steel shell, and the final condensers and coolers are cast iron of the coil-in-box type.

Ammonia is injected into the vapor lines upstream from the coil-in-box condensers to control the corrosion of this equipment. Ammonia injection and its control have been discussed on numerous occasions. In this particular case, the pH of the water condensed with the naphtha is maintained at 6.5 to 7.0. Water is injected upstream from the ammonia-injection point to prevent the deposition of ammonium salts in the vapor lines and condensers. Higher pH's are avoided to conserve ammonia. If higher pH's were maintained considerable quantities of the ammonia would be consumed in neutralizing hydrogen sulfide. This is of no particular significance in corrosion control under conditions of this type.

Frequently, ammonia is injected upstream from exchangers that are equipped with copper-bearing alloy tubes. It is normally assumed that copper-bearing alloys in condensers on sour-distillate streams would be corroded rapidly by ammonia when this neutralizer is injected upstream from such condensers, particularly if the pH of the water condensed with the sour distillate is maintained above the neutral point. It has been found in practice, however, that this is not the case. Several observations have been cited in an attempt to explain this apparent anomaly, but no satisfactory explanation has appeared in the literature. Results of some recent work on this phase of the problem indicate that certain sulfur compounds, such as hydrogen sulfide, mercaptans, carbon disulfide, etc., are very effective inhibitors for controlling the corrosion of copper-bearing alloys in atmospheres containing ammonia and oxygen. Results presented in Table 2 show the extent to which sulfur compounds reduce the corrosion of admiralty metal in a 10-per-cent-by-weight solution of ammonium hydroxide at room temperature for 48 hours.

In another case, admiralty metal under stress failed as a result of stress-corrosion cracking in an atmosphere containing ammonia, moisture, and oxygen after 3 hours of exposure. This test was repeated with 3.0 per cent by weight of butyl mercaptan added to the ammonium-hydroxide solution over which the stressed admiralty metal was suspended. After 194 hours of exposure, there was no evidence of failure as a result of stress-corrosion cracking. Equally good results were obtained with hydrogen sulfide and carbon disulfide.

Corrosion in other portions of the pipe-still equipment is not a problem of any consequence.

TABLE 2—EFFECT OF SULFUR COMPOUNDS ON CORROSION OF ADMIRALTY BY 10 PER CENT AMMONIUM HYDROXIDE SOLUTION

Sulfur compound added—	Per cent added	Corrosion rate (In. per year)	Reduction of corrosion rate (per cent)
None	...	0.5895	...
Ammonium hydrosulfide	0.025	0.0368	93.8
Ammonium hydrosulfide	0.05	0.0187	96.8
Ammonium hydrosulfide	0.10	0.0320	94.5
Ammonium hydrosulfide	0.30	0.0096	98.4
Butyl mercaptan	0.25	0.3930	33.4
Butyl mercaptan	0.50	0.0678	88.5
Butyl mercaptan	2.0	0.0442	92.6
Butyl mercaptan	2.5	0.0315	94.5

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NEW LAND SURVEYING TOOL

by Charles J. Deegan

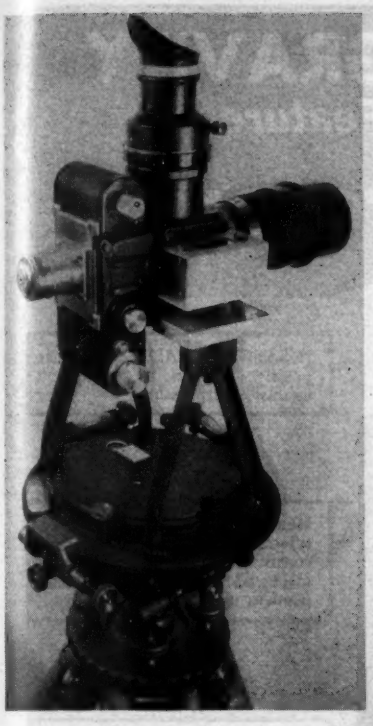

Fig. 1—(bove) Standard transit head on which 35-mm. camera with horizontal and vertical lenses have been substituted for regular telescope and vertical arc

Fig. 3—James R. New of Republic Exploratory Co., is shown examining a strip of 35-mm. film on which survey notes are recorded, and from which all necessary computations for surface traverse and elevations can be made

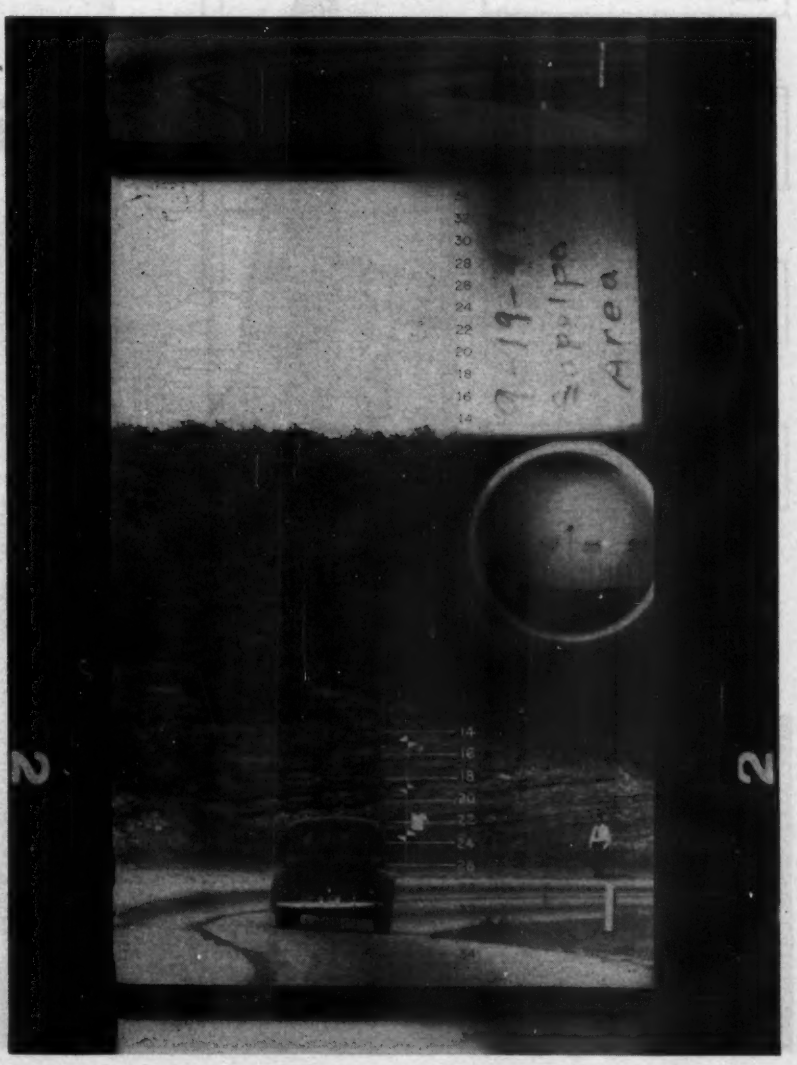

Fig. 2—(Right) Sample of film record which takes place of conventional notebook entries of survey readings. Note "mil scale" lines across stadia rod, from which mathematical computations can be made. In examination of original film, all these lines show up clearly. In photographing for reproduction, these lines are largely "lost," except where retouched, thereby failing to indicate how easily the scale lines can be read in routine operation of examining film

A NEW stadia surface traverse, and elevation-measurement surveying tool has been developed in which a 35-mm. camera and photogrammetric techniques are substituted for the usual telescopic and vertical arc equipment on a transit. A photographic record takes the place of conventional entries in field notebooks.

The new method is labeled "geophotometric mapping" by the inventor, W. O. Bazhaw, geophysicist, recently elected vice president of Republic Exploration Co. of Tulsa. He was assisted in the development of the new instrument and techniques by James R. New, geophysicist and civil engineer. A patent has been applied for.

The camera, which is the heart of the instrument, is mounted on a conventional surveying-transit head, from which the telescope and vertical arc have been removed. (See Fig. 1). This camera is equipped with two lenses, one vertical and one horizontal. The horizontal lens is focused on

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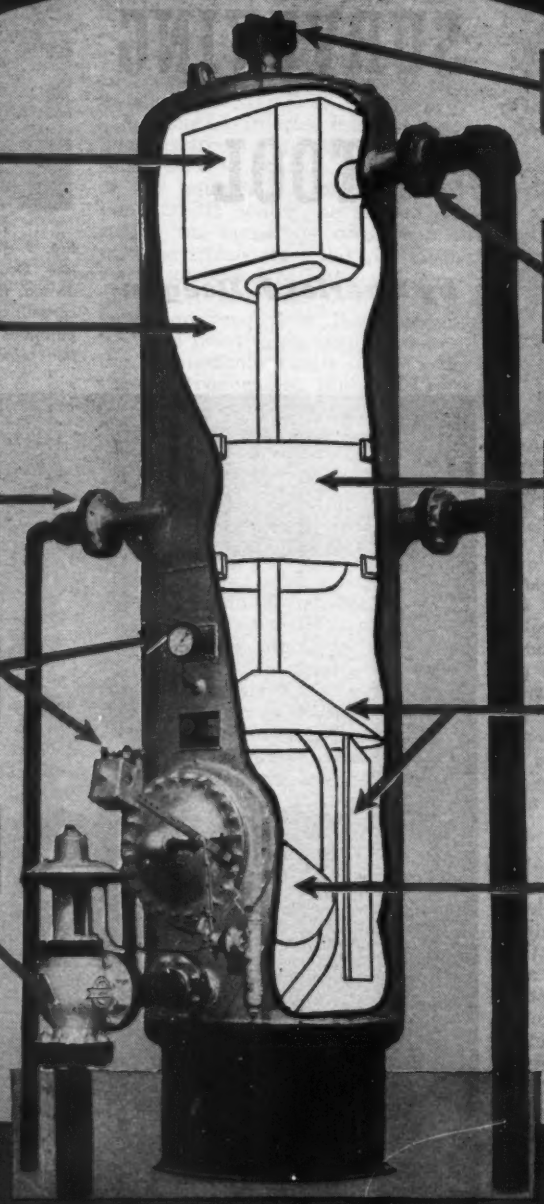

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the stadia rod, just as a conventional surveying telescope would be. The vertical lens is focused on the magnetic needle for bearing readings. Back of the horizontal lens system inside the camera is a mil scale grid, which is automatically printed on the negative of each shot. Both pictures appear on the same film and form a permanent record. (See Fig. 2). In practice, all computations are made directly from the 35-mm. film-record, which is examined through a standard magnifying micrometer reading device. (See Fig. 3).

The lens used in the camera for horizontal shots has a focal length which permits determination of elevations through computations based on the position of the stadia-rod markers with respect to the mil-scale grid markings on the film. The lens most commonly used has a vertical range, for such computations, of 5° plus or minus from the horizontal plane through the height of the instrument. All shots are made with the instrument in a level position, varying the length of the shot in accordance with the roughness of the terrain. However, greater or lesser vertical angles can be measured by substituting a camera lens with a different focal length. Accuracy claims are 3 ft. in 1,000 ft. for stadia distances, and possible vertical angle difference measurements to within 6 seconds of arc for level computations.

The major advantage claimed for the new instrument is a saving in surveying time. The total time saving comes in three phases. First, the actual time required to obtain a reading is somewhat shorter, particularly under conditions of heat waves, or of haze. Second, the time ordinarily consumed in making entries in the field notebooks is eliminated. The third, and often major source of time saving, results from almost complete elimination of the necessity for return trips to the field for rechecks to find "busts.' There can be no error in entering the readings in the notebook; the camera records without error what it sees.

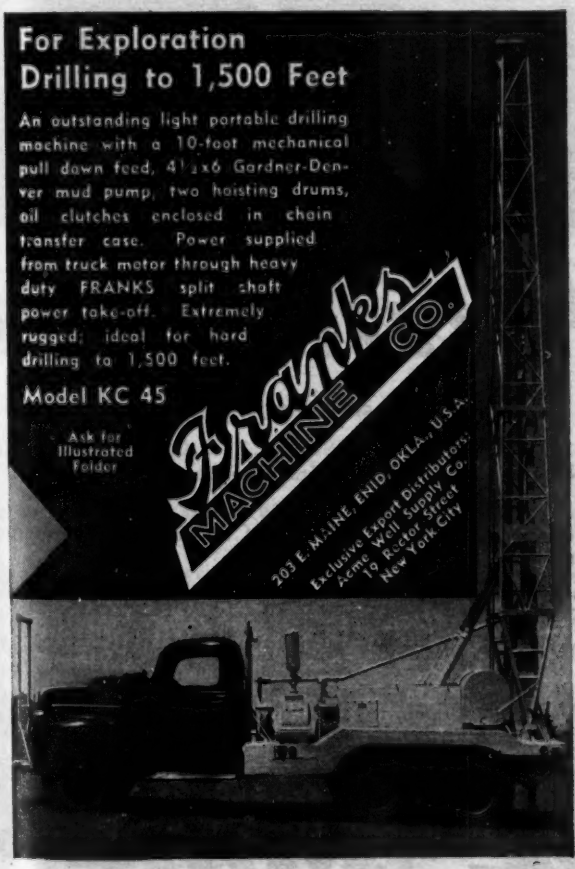
Geophysical Work

All computing work is done in the office under favorable conditions, and a double check can be run by two men in a minimum of time. There are also additional advantages resulting from having a photographic record. Enlarged prints from the film may be of service in locating, identifying, and recording old survey lines, land lines, section corners, or other property markers.

In geophysical work, observation of the film in the office will indicate the need for special terrain corrections at certain gravity-meter settions. The geologist may find it valuable as a visual check on geological outcrops in studying the surface geology. On exposed stratigraphic sections, the elevations, dips, contacts, thicknesses, etc., of various geological formations may be studied in detail.

On a recent 6-mile traverse under conditions similar to those generally found in gravity-meter work, the surface closure was off 20 ft., and the elevation closure was off 0.21 ft. in a total range of elevations differences of 182 ft. The surface closure error was much smaller than that generally considered necessary in gravity-meter survey work, and probably was largely due to variations in magnetic bearing, possibly due to local magnetic disturbances. Hub-to-hub work is not customary in this type of work, since a 1-ft. error in elevation influences the final gravity computations about the same amount as a 300-ft. error in surface traverse.

For more accurate surface traverse work, the vertical lens can be modified to photograph azimuth vernier instead of the magnetic bearing. The instrument is adapted to reconnaissance surveys of public highways, public-works projects, well elevations, topographic and geologic mapping, or any other large-scale surveys, where the accuracy required does not exceed that of third-order leveling.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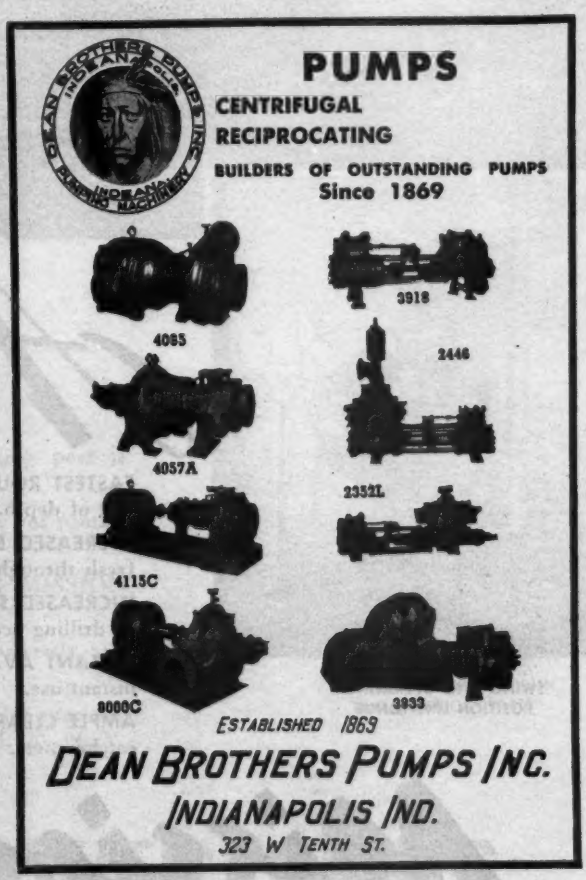

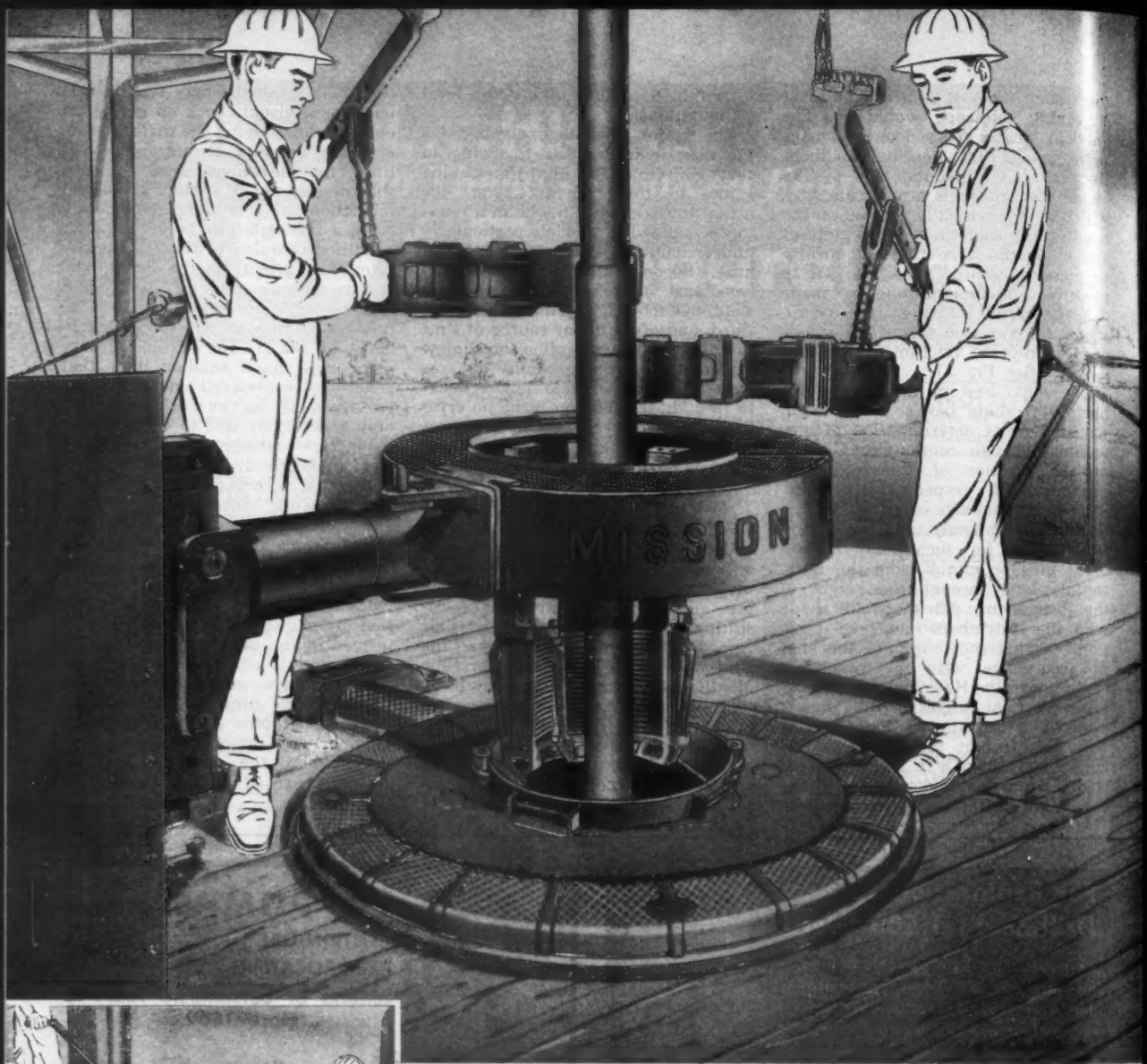

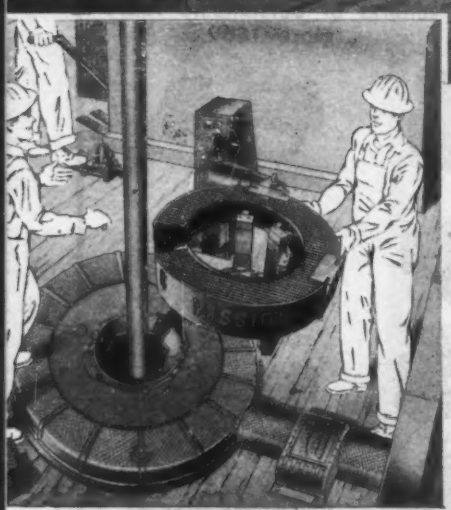

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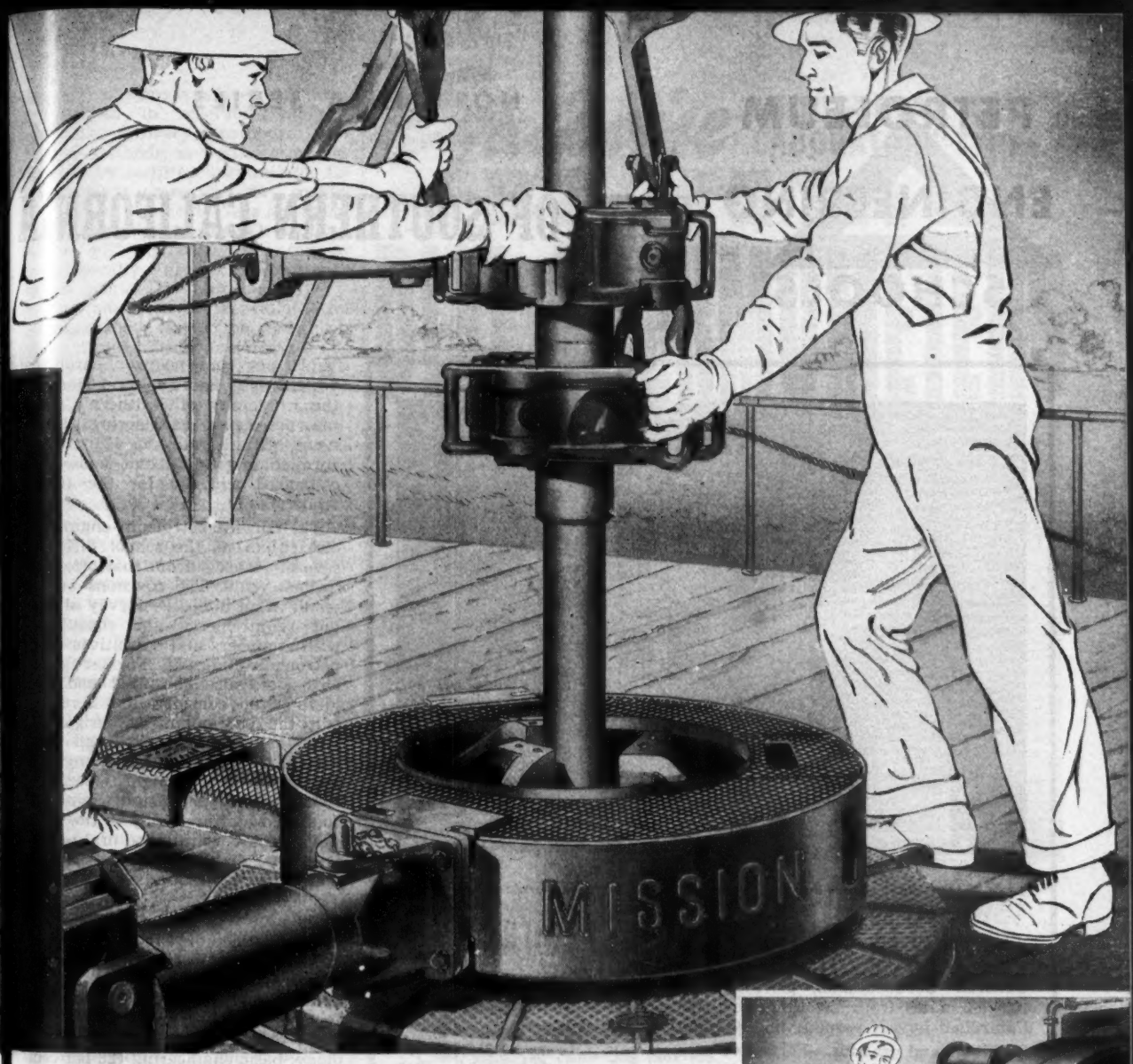

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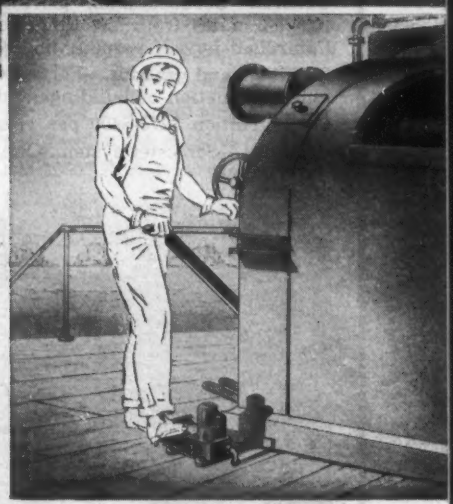

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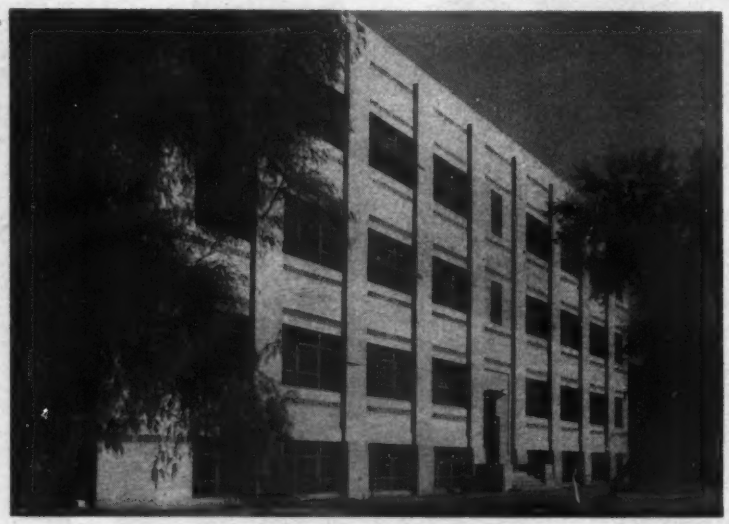

Engineering Building, University of Southern California

SALIENT FACTS AND FIGURES

General.—Coeducational, privately controlled. Campus in University Park, 3 miles from Los Angeles business section. Chartered in 1880. Controlled by self-perpetuating 30-man board of trustees.

Buildings and grounds.—Forty-five-acre campus. Library of 256,000 volumes. Valuation of buildings and improvements was $4,850,000 in 1940.

Fees.—Tuition $270-$400 per year.

Calendar.—Semester system. One 6 and one 5-week summer term.

ROBERT E. VIVIAN
Dean, college of engineering

THOMAS CLEMENTS
Professor of geology, acting head, P.E. department

CHARLES R. DODSON
Associate professor, petroleum engineering

A 50 per cent postwar enrollment increase has been registered in the University of Southern California petroleum engineering department with a total of 121 students enrolled for the present semester as compared with 86 for the 1940-41 school year.

The current petroleum-engineering curriculum at the school differs in several respects from that offered in former years. The revisions are the result of an intensive survey of student requirements and consultation with engineers and executives of the petroleum industry. Former graduates were also consulted and their ideas given consideration. As a result the curriculum is designed to give the student a thorough background in basic science and engineering rather than a highly specialized course. The petroleum-engineering courses are offered only in the senior year. Report writing and oral presentation are emphasized in response to many industry requests.

Four Basic Units

The curriculum may be broken down into four basic units as follows (figures in parenthesis are the percentage of the total curriculum): Basic science (40 per cent)—chemistry, physics, mathematics, and geology; basic engineering (26 per cent)—thermodynamics, fluid mechanics, etc.; petroleum engineering (16 per cent)—reservoir mechanics, laboratory, etc.; and liberal arts (12 per cent)—english, history, economics, and electives.

Dean of the engineering school at Southern California is Dr. R. E. Vivian, and acting head of the department of petroleum engineering is Dr. Thomas Clements. Faculty members include Assoc. Prof. C. R. Dodson (B.S., M.S., 11 years production department, Standard Oil Co. of California); Asst. Prof. F. A. Landee (B.S., Ph.D., 6 years Dow Chemical Co.); Lecturer Dean Sheldon (B.S., M.S., consulting petroleum engineer); and Lecturer Carlton Beal (B.S., M.S., consulting petroleum engineer). In addition to these men, industry petroleum engineers Law, Wade, Sherborne, Larsen, and others teach night-school classes.

B.E., M.S., and P.E. degrees are granted in petroleum courses with the length of the regular undergraduate curriculum being 4 years. The

graduate student is offered a number of courses in reservoir analysis, secondary-recovery methods, subsurface methods, as well as seminars. Laboratory facilities are available for independent research in several branches of the field. Plans are under way to establish a research program which will be largely financed by a cooperative group of companies which operate in California.

Four laboratories are available for undergraduate instruction as follows: oil and gas testing, fuel testing and gas metering, core analysis and drilling fluid study, and high-pressure tests, gas solubility, etc. Arrangements are made for regularly scheduled trips to nearby oil fields and laboratories to observe drilling and production operations. Laboratory assistantships, with a stipend of $800 per year, are offered and the assistant is permitted to enroll in eight units of the curriculum per semester.

Six honorary fraternities and societies have chapters on the campus for which petroleum engineers are eligible. These are: Tau Beta Pi (honorary engineering); Phi Kappa Phi (honorary scholastic); Sigma Phi Delta (professional engineering society); American Institute of Mining and Metallurgical Engineers (student chapter); Sigma Gamma Epsilon (honorary geology and petroleum engineering); and Sigma Xi (honorary scientific).

Since University of Southern California is located in an active oil-producing area, the demand for night courses in petroleum engineering is considerable. Courses in core analysis, drilling-fluid technology, reservoir analysis, seminar, etc., are offered. The courses are usually taught by practicing engineers.

Estimated average starting salary of the 1947 petroleum engineering graduate with a B.S. degree was $275 per month as compared with $165 for 1941, the last prewar school year. Enrollment figures by classes for the current school year are: freshman, 10; sophomores, 26; juniors, 46; seniors, 30; and graduates, 9.

Greatly increased laboratory and research facilities for the department will be available upon the completion of a second unit of the engineering building which is now being planned. This section will house the petroleum, chemical, and industrial engineering departments of the school.

Ratio Ordered Reduced

AUSTIN.—A special order calling for the reduction of the gas-oil ratio in the Wasson field, Gaines and Yoakum counties, West Texas, from 5,000 to 2,000 cu. ft. of gas per barrel of oil produced has been issued by the Texas Railroad Commission.

East Texas field operators were ordered by the commission to submit by January 1 a well-status report covering all wells in the field.

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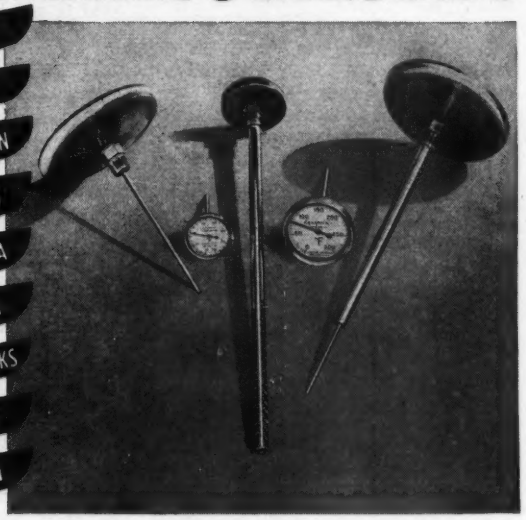

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Resid Wall Wash

What are the advantages and disadvantages of resid wall wash for a Dubbs cracking unit?—R. M. A.

Two general types of wall wash or quenching mediums are used for the flash chamber of nearly all kinds of cracking plants. One medium is a distillate material such as light or heavy cycle oil, overhead from a flash of the fuel oil, or even incoming feedstock. Obviously, such materials must be vaporized in the flash chamber and hence they find their way through the system as a vapor and increase the sizes of lines and fractionating equipment. However, they remove a relatively large amount of heat per pound of material. Such materials also exert a mild "carrying" effect and thus permit slightly lower flash-chamber temperatures.

The other type, namely residuum or fuel oil, must be circulated in larger quantities because its heat of vaporization is not removed. The larger quantity may wash the walls more effectively than distillate stocks. Theoretically it acts to supress vaporization and calls for a higher flash-chamber temperature, but no definite indications of more coke formation by the use of resid wall wash has been reported and in fact it seems to be an excellent method of supressing coke formation in the flash chamber.

Tests of Quenching and Tempering Oils

Please advise us the specifications for steel quenching oils and any particular requirements not covered by specifications.—N. P.

In quenching, mineral oils cause slower cooling than water and the rate of cooling is not greatly affected by variations in temperature of the oil. This makes mineral oil particularly suitable for quenching all types of steels particularly because irregular-shaped pieces do not set up excessive stresses within themselves.

For quenching, the viscosity of the oil should be low so that convection currents will carry the heat away from the work, but too thin oils may be too volatile. Thus, paraffin-base oils that have a high boiling range or flash point for a given viscosity, are preferable. Such oils are also more resistant to oxidation or sludging. Although fatty fish and animal oils tend to oxidize and carbonize, they are often added to mineral oil in small amounts because their lower surface tension or better wetting ability is said to aid in dislodging bubbles that stick to the hot metal surface. Compounded oils do give slightly lower and more uniform rates of cooling.

Somewhat the same applies to tempering oils. However, the tempering bath is often held between 400°-600° F. and hence thicker, higher-flash oils are employed.

Specifications.—Little in the way of specifications are available. W. G. Forbes in his, "Lubrication of Industrial and Marine Machinery" (John Wiley & Sons, New York, 1943) recommends only:

Quenching: Saybolt viscosity, 100-300 seconds at 100° F. with or without 3-5 per cent lard oil.

Tempering: Saybolt viscosity, 250-300 seconds at 210° F. and minimum flash point 600° F.

He cautions that the viscosity of oils increases with use or oxidation and hence laboratory tests of the rate of viscosity increase should be conducted.

Special Report No. 24 of the Iron and Steel Institute (London) also entitled, "Second Report of the Alloy Steels Committee" (1934 or 1940) shows the following properties for three mineral oils (along with tests on four other oils), as in the accompanying table.

	A (new)	A (used)	C	G
Saponification value, mg. KOH per g.	nil	4.8	1.4	...
Acid value, mg. KOH per g.	0.38	2.06	0.14	...
Iodine value (Wijs on 5 g.)	6.0	6.0	5.0	3.0
Flash, Pensky-Martin, °F.	305	325	410	400
Flash, open cup, °F.	330	345	425	425
Specific gravity	0.884	0.894	0.867	0.866
Viscosity (Redwood No. 1) sec. at 100° F.	97	108	130	130
Viscosity (Redwood No. 1) sec. at 200° F.	37	38	42	41
Viscosity stokes at 100° F.	0.235	0.267	0.330	0.324
Volatility loss, wt. per cent	21.5	17.5	8.0	9.0
Tendency to sludge (B.S.S. 148-1933), per cent	1.34	2.6	0.64	0.85
Ramsbottom coke number	0.11	0.47	0.12	0.07
Properties after Air Ministry Oxid. Test:				
Viscosity, stokes at 100° F.	0.335	0.436	0.500	0.599
Ramsbottom coke number	1.45	1.77	0.98	1.26

Special test methods are described in the report and are shown in abbreviated form here.

Volatility (B. W. Methley)—15-20 g. oil are placed in an open 2¼-in. diameter porcelain crucible which is heated directly by a flame. The loss in weight per cent during 2 hours at 200° C. is the **volatility.**

Sludging tendency—Holding 100 g. oil at 150° C. for 45 hours while passing 0.07 cu. ft. of air through the oil each hour. The oil is extracted with petroleum spirit, allowed to stand 16-24 hours and filtered. The percentage of dried residue is the **sludging tendency.**

Air Ministry Oxidation Test—A modification of the sludging tendency test wherein 40 ml. of oil in a tube is held at 200° C. Air (15 liters per hour) is blown through the oil for 6 hours each day.

Significance of tests.—According to this report the significance of the various tests are as follows:

1. Saponifiable matter — Little in mineral oil and hence this test indicates compounding.

2. Acid value — An indication of quality and age.

3. Iodine value — Useful as a means of identifying oils.

4. Flash point — Indicates fire hazard.

5. Specific gravity — Identification.

6. Viscosity — Related to rate of cooling. Thin oils are superior and "carrying away" or "drip" loss is smaller.

7. Volatility — Indicates losses and rate of sludging. Uniformity of quench is affected by the formation of gas bubbles.

8. Sludging — Cannot be directly interpreted but affects rate of quenching as the oil becomes old.

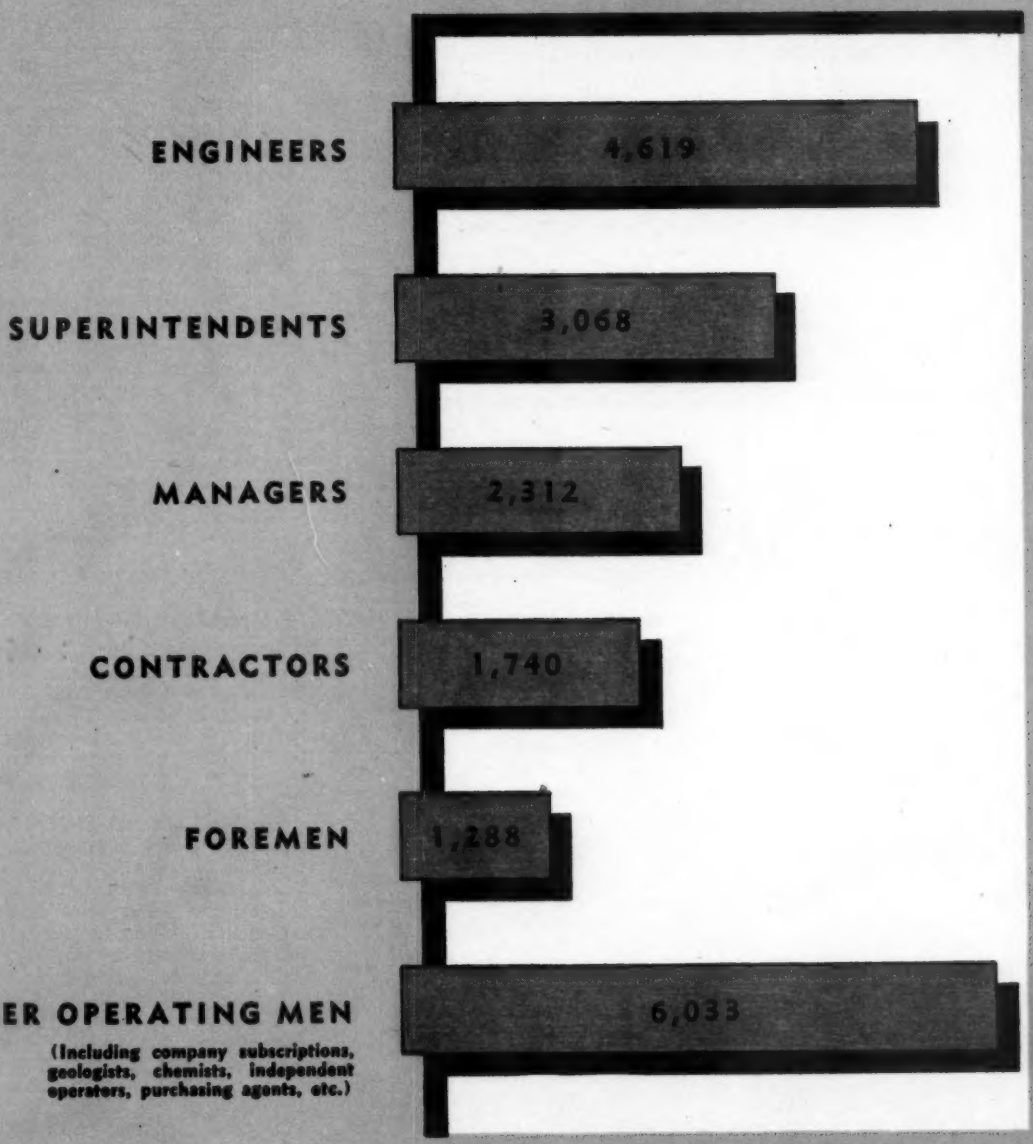
9. Ramsbottom coke — Indicates tendency toward the formation of carbonaceous materials.

10. Specific heat and thermal conductivity — Do not vary much in mineral oils.

Laboratory quenching methods are also described **(and briefly in Quenching Oils and Tests, The Oil and Gas Journal,** May 16, 1940, page 163).

Spring, Lansdale, and Alexander, Am. Soc. Metals, 1943 (Preprint 3 of the October meeting) are unable to attach much significance to any test results except (1) flash and fire points should be high to prevent fire and (2) losses by "drag out" and volatility must be low. They feel that origin of the oil (i.e., mineral, animal, or mixed)) has little effect on quenching rate and that viscosity within reasonable limits can be compensated for by adjustment of temperature.

Of The Oil and Gas Journal's 23,004 paid subscribers, 19,060 are classified occupationally by the Audit Bureau of Circulations, in the statement of June 30, 1947, divided as follows:



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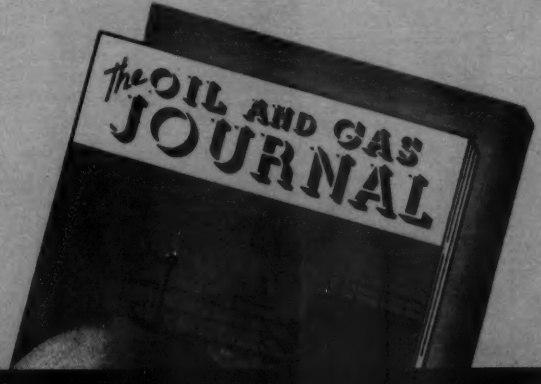

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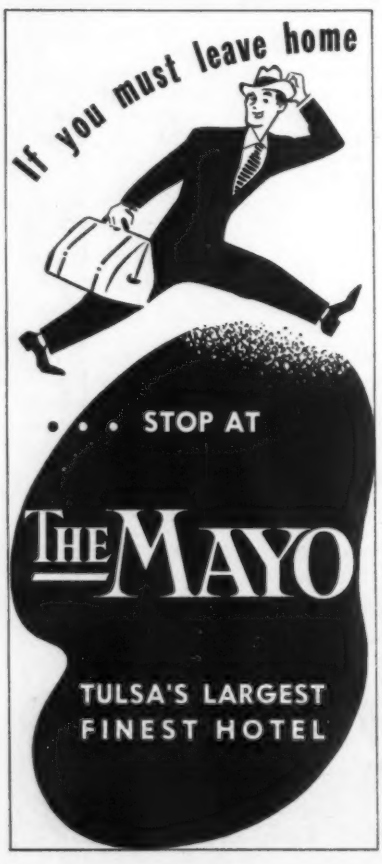

Offshore Exploration

(Continued from page 59)

Both types of drilling structures would be built in any convenient coastal shipyard, and towed by tugs out to an offshore location.

The J. Ray McDermott drilling rig, as shown in Fig. 1, consists of a drilling deck 240 ft. long by 120 ft. wide. The deck is 44 ft. above the pontoons, and is supported by 16 wing towers and 100 tubular columns. A slot 20 ft. wide and 75 ft. long is built into the center line at the drilling end of the rig as a means of accommodatiug a permanent production platform in the event of the completion of a producing well.

Each of the two pontoons, which provide buoyance for floating the marine drilling rig, is 240 ft. long by 58 ft. wide by 12 ft. deep. These pontoons are subdivided by longitudinal and traverse bulkheads into a number of separate watertight compartments. These compartments are designed for flooding by means of valves in the bottom operated from the drilling deck. By controlling the amount of water admitted, the pontoons can be sunk on an even keel to the desired depth and the flooding then stopped. The contained water can be removed when desired, either by pumps permanently built into the pontoons or by compressed air.

The marine drilling rig is entirely stable with the pontoons full afloat. However, when the pontoons are flooded and their top decks go under the surface of the water, the necessary stability and depth control are effected by wing walls or towers. The higher the drilling deck is placed above the pontoons, the greater the tower area needed to hold the rig upright while it is being submerged. The present design of this structure involves the use of 16 towers 14 ft. in diameter. Location of these towers on the pontoons is shown in Fig. 2. The towers will be subjected to hydrostatic water pressures and wave impacts, and will therefore be adequately braced.

The tubular legs, which also support the drilling deck, are arranged in transverse bents. These columns are 20-in. pipes and are continuous from the top deck on down through the pontoon bottom so that piles may be driven through them.

In spotting the marine drilling rig on location it would be temporarily moored by several anchors in order to hold it in position. The pontoons would be partially flooded and the rig lowered so that the pontoon deck would be 20 ft. below the water surface. The designers estimate that in fair weather this operation and the driving of piles should be completed within 1 to 2 working days. The number of piles which would have to be driven would depend upon the probability of storms. In the periods of comparatively good weather only a few piles should be necessary to stabilize the rig and hold it in position. In this manner practically all of the weight of the rig will be carried by the buoyancy of the submerged pontoons. In case of storm warning, as many additional piles can be driven in a few hours as deemed necessary to secure the rig against the kind of weather expected.

In moving to another location, the pontoon buoyancy would be adjusted to assure a small downward load on the piles. The piles would then be pulled one at a time until only a few remained. Jets could be used to assist the pulling of the piles if necessary. When finally ready to break out the last few piles, the pontoon would be unwatered and the remaining piles pulled as a group when the pontoons rose to the surface. According to the designers, it should be possible to use this type of marine drilling rig in offshore areas in depths of water exceeding 100 ft.

The estimated total weight of the McDermott structure with drilling equipment installed, oil and water tanks full, will amount to 5,000 tons (2,240 lb.) or a little over 11 million pounds.

	Tons
Deck load	1,480
Deck structure	750
Piles	350
Bracing	150
Wing towers and columns	400
Two pontoons and cross connections	1,500
Water	200
Oil	170
	5,000

Mobile Drilling Platform

The mobile drilling platform, designed by Fransho, has also received favorable Gulf Coast engineering appraisal as a possible means of eliminating the loss in unrecoverable labor and materials connected with the fixed type of offshore platforms now being used.

This unit consists of a superstructure built upon a floating base (hulls) which is to be sunk on location. The unique feature of this particular type of platform is that it is designed to use weighted fluid in the hulls as a means of imparting stability to the unit after it has been sunk.

Patent application sketches (Figs. 3 and 4) give a general idea of this drilling platform. These sketches show end views of a twin-hull design.

Actual plans, however, are for a drilling deck 190 ft. long and 80 ft. wide. The deck will be supported by a superstructure built on two hulls, each 190 ft. long, 80 ft. wide and 8 ft. deep. The total weight of this structure is approximately 1,945 tons, as follows:

	Tons
Twin hull base and bracing	368
90-ft. superstructure (including 5-ft. diameter stabilizer columns)	1,237
Decking	100
Empty tanks, mud ditch, and derrick substructure	240
	1,945

With the exception of tanks, mud

ditch, and derrick substructure, all heavy equipment would be installed after the structure has been sunk on location. According to Fransho drilling equipment could be a permanent part of such a structure designed for drilling in comparatively shallow water where the superstructure would not exceed 50 ft. in total height. But for operation in areas where the water is approximately 50 ft. in depth the height of the superstructure would be approximately 90 ft. and drilling equipment in place would make the structure too top heavy for towing even in calm weather.

Specially built mud-ballast compartments are located in the ends of the two hulls and on the center line of each side. A 16-lb. fluidity-retaining mud is contemplated for use in this type of structure. The volume of space occupied by mud-ballast compartments amounts to 62,500 cu. ft.

In order to control the stability of the structure during sinking operation, stabilizing columns have been incorporated into the framework design of the superstructure. These stabilizers will be 5 ft. in diameter at their base on the hulls and tapered in diameter upward so that the portions of the stabilizers which extend above the water will be only 20 in. in diameter. Present design specifies 35 stabilizer columns; however, this number may be altered.

When floating at light draft the twin hulls have a free board of 3.52 ft. Since storm warnings are given many hours in advance of extremely rough weather it should be possible to tow the structure to location during comparatively calm conditions.

In sinking the structure on location sea cocks will be opened and water admitted at a controlled rate so that it will sink gradually to the bottom. When on bottom the interconnected mud-ballast compartments will be filled with weighted fluid held in readiness on an oil barge. Raising the structure will be accomplished by means of compressed air. Mud from the mud-ballast compartments will be returned to the tanker barge.

When on bottom and with drilling equipment installed the total weight of the structure will amount to approximately 5,000 tons, as follows:

	Lb.
Decking and all drilling equipment including full water and full tanks	4,224,000
Superstructure and hulls	2,960,000
Weighted fluid in hulls	4,000,000
Total weight	11,184,000

While a great many problems of design will have to be worked out in connection with both of these offshore methods, they appear to be the most practical ones which have been advanced so far for this type of work. At least they offer the mobility which operators contend is needed for offshore drilling operations.

Electric Logging

(Continued from page 67)

being one of them. Another method originated by Guyod[3] makes use of the empirical relationship between the ratio of **apparent resistivity** of the object formation to that of shale and of the ratio of the **true resistivity** of the object formation to that of shale. A different curve is available for each ratio of object bed thickness to electrode spacing. Since the bed thickness can be estimated very closely from the self-potential well as from the resistivity curves, one can read directly the true resistivity-shale resistivity ratio and compute the object bed's true resistivity.

References

1. Resistivity Departure Curves, Schlumberger Well Surveying Corp., Houston, May 1947.

2. Doll, H. G., et al, "True Resistivity Determination from the Electric Log—Its Application to Log Analysis," A.P.I. Pacific Coast District meeting, May 15-16, 1947.

3. Guyod, H., "Electrical Well Logging," (Figs. 6-19), The Oil Weekly, Aug.-Dec., 1944.

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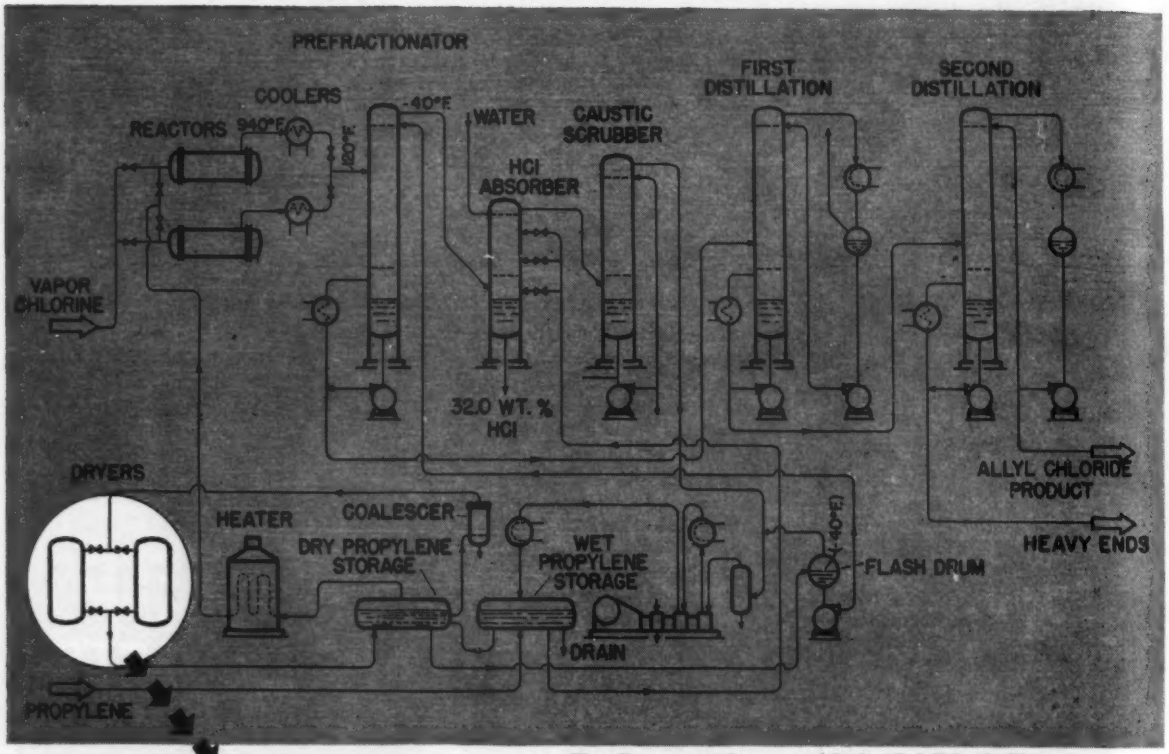
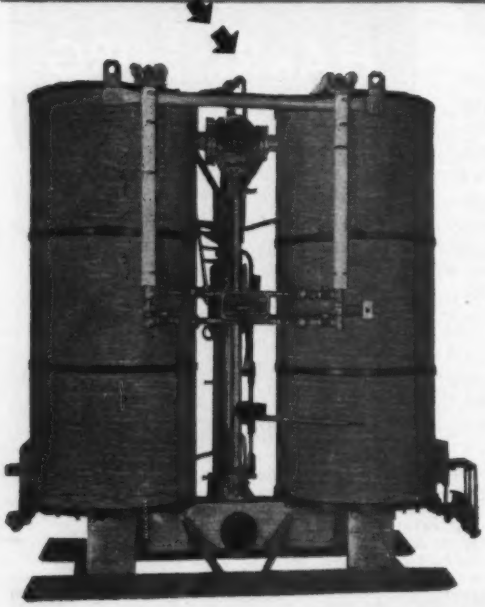


Flow Diagram of Commercial Scale Allyl Chloride Plant



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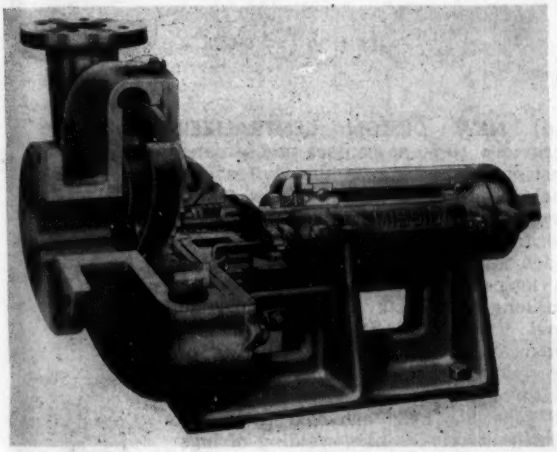
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears

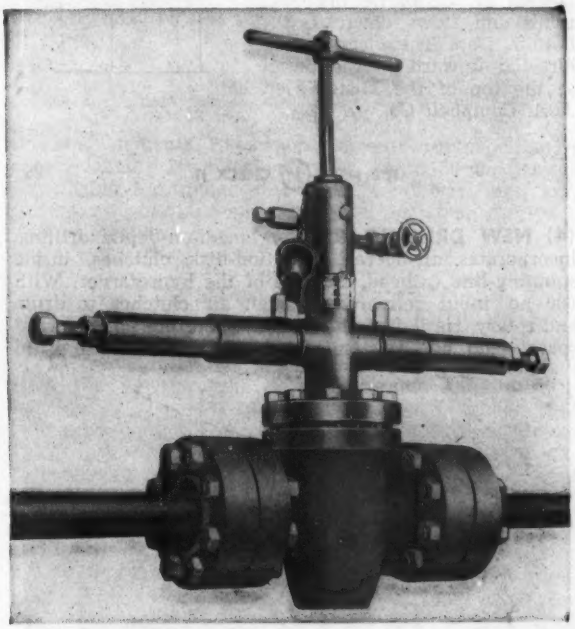
(1) NEW CENTRIFUGAL PUMP utilizes the Sherzer hydraulic principle. Pump, with a concentric casing, reduces turbulence and cavitation found in volute-cased pumps. Only four easily removable parts—casing, impeller, wear plate, and shaft—are in contact with the



fluid pumped, and are available in any workable alloy for handling corrosive liquids. It is a single-stage, end-suction type, with nonclogging fluid passages which permit handling of slurries containing materials in suspension or solids. Changes in capacity and head requirements within a wide range can be accomplished by change of impeller diameter or of casing and impeller size. Repairs may be made in a minimum of time. *Mission Manufacturing Co.*

IT'S NEW CHECK IT

(2) SURFACE SAFETY VALVE prevents line breaks caused by excessive pressure increase, or shuts off a broken line. Valve is a self-contained, pressure operated, full-opening gate valve which automatically closes whenever operating pressure goes above or below that for which the valve is set. Operating pressure can be supplied by the line in which the safety valve is installed, or it can be furnished through a connection to an outside source. When the valve is operated by line pressure, all connections are within the valve itself. When an external source of operating pressure is used, it is connected directly into the operating cylinder of the safety valve. Operation is identical, regardless of the source of pressure. In either case, no electrical con-



nections or remote-control mechanisms are required. In operation, when valve is open operating pressure is applied to both sides of a piston. As long as this equalized condition exists, valve remains open due to upper end of stem being exposed to atmosphere. However, when pressure beneath piston is exhausted at atmosphere, full operating pressure is then applied only against the top of the piston and instantly closes the valve. Pressure is exhausted from the cylinder beneath the piston through adjustable spring-loaded pilot valves which automatically snap open when pressure increases or decreases to a predetermined high or low limit. *Otis Pressure Control, Inc.*

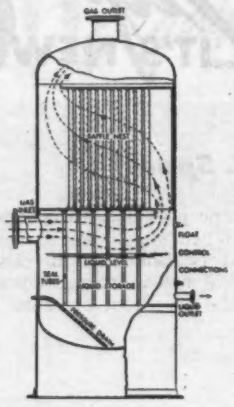
IT'S NEW CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

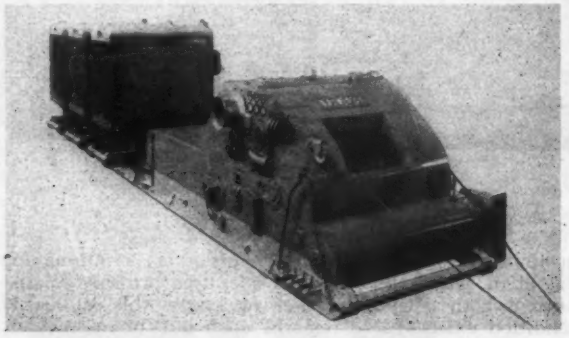
OIL AND GAS EQUIPMENT Digest — IT'S NEW CHECK IT

(3) SCREENLESS MIST-D-FIER, an improved gas separator, embodies a series of curved welded baffles installed in staggered rows. Gas passing between baffles must turn sharply to gain the stagger openings of the next row, and so on, through 11 rows. Mist particles are thrown out of the flow by centrifugal action and impinge on the curved surface of the baffle, forcing the liquid into vertical slots where it trickles down to the bottom of the baffle into seal tubes and flows down to the bottom trap. The clean gas is directed upward to the outlet at the top of the Mist-D-Fier. *J. A. Campbell Co.*



IT'S NEW CHECK IT

(4) NEW DRILLING RIG, for medium-depth drilling, incorporates air-operated friction-disk clutches, inside spinning-line cathead, and use of the hydrotarder. With 600 hp. input delivered through air clutches to drum and rotary, rig is fast and smooth operating. Six forward speeds and one reverse speed are delivered to drum



and rotary. All forward speeds are selected by turning a single hand wheel. Speeds are chosen in any sequence without progressing through intermediate speeds. Air-operated friction-disk clutches utilize special friction disks that operate efficiently even when oil is present. An air-operated breakout cathead is mounted on the rotary side and a plain cathead on the driller's side. High-speed hydrotarder is mounted inside the draw-works housing and is chain driven from the drum. Water-level tank for hydrotarder is placed inside and a single handwheel at the driller's position regulates water level. Water from the hydrotarder discharges into a sump mounted on side of rig near driller. By glancing at discharge flow driller is assured that the proper amount of water is passing through hydrotarder system. Rig is powered by either two or three oil-field engines connected to the compound through airflex clutches. Draw works and transmission, compound and engines are normally transported as a single unit. *International Derrick & Equipment Co.*

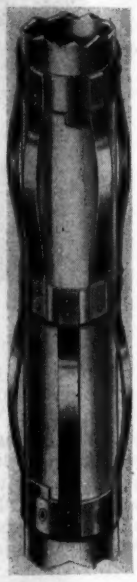
IT'S NEW CHECK IT

(5) SUPERMODERN TWIN - QUAD TRANSPORT is equipped with engines completely submerged in the wings; combines four engines with two propellers; has integral emergency landing keels on the bottom; and uses the "V" tail, first put on a production airplane in

the Beechcraft Bonanza. Clean aerodynamic design and excellence of view afforded all passengers are features of the new plane. The combination of slow-turning propellers and engine exhausts above the wing results in a very quiet airplane. *Beech Aircraft Corp.*

IT'S NEW CHECK IT

(6) NEW DESIGN CENTRALIZER provides 10-point contact and greater peripheral bearing on the wall of the hole. Centralizer has 10 staves which work as a unit to provide greater centering strength. Due to its shorter arc, each stave has twice the strength as a long-stave arc. Centralizer is 33¾ in. long. Spring staves are 1½ in. wide and $\frac{7}{16}$ in. thick. Staves are cold riveted to the end rings. Staggering of the staves gives 10 points of contact with only 5 springs. Easy installation of pipe has been achieved by a design that permits plug welding of lugs inside each end ring. With the centralizer in place casing may be rotated without rotation of the centralizer, thus preventing damage to the centralizer as well as to the well bore. *Larkin Packer Co.*

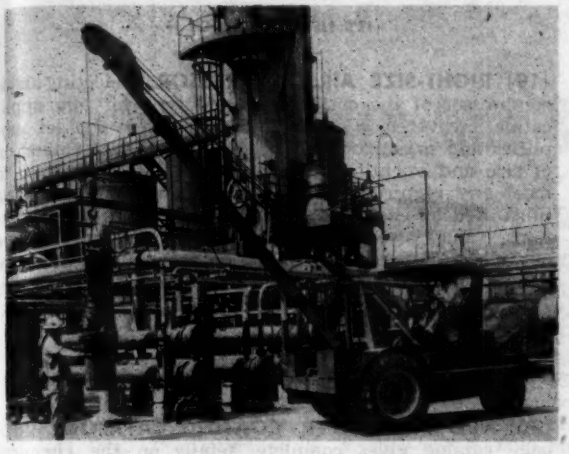


IT'S NEW CHECK IT

(7) NEW INDOOR-OUTDOOR THERMOMETER registers both indoor and outdoor temperatures. Instrument is designed for the home, private office, or plant. It may be placed at any convenient location and is as easy to read as a clock. Face is divided into two separate temperature ranges. Top range indicates the outdoor temperatures while the bottom range shows the indoor temperatures. Outdoor temperatures are shown in black and indoor temperatures in red to set off the two temperature scales. Instrument is enclosed in a highly finished baked-enameled case. *Jas. P. Marsh Corp.*

IT'S NEW CHECK IT

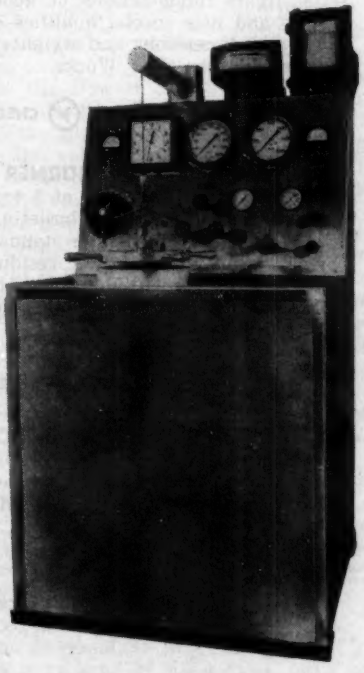
(8) NEW KRANE KAR loads, unloads, transports pipe, machinery, and other heavy or bulky equipment in the oil fields and at refineries and natural-gasoline plants. Features include automatic load and boom braking, and stability without jacks or outriggers. One engine pro-



vides power for all the crane and travel operations from one seat. Driver has unobstructed vision all around. Four speeds forward and one speed reverse. Gasoline or diesel operated. Available with pneumatic or solid-rubber tires. Front-wheel traction — rear-wheel steer. Will climb grades up to 20 per cent loaded. *Silent Hoist & Crane Co.*

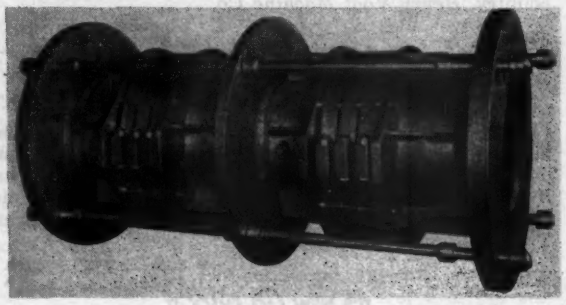
IT'S NEW CHECK IT

(9) SUPER-PRESSURE CONSISTOMETER tests cement slurries under elevated pressures and temperatures. Equipment can be used for studying the pumpability of different kinds of cement slurries under different conditions encountered in actual field practice. Instrument is calibrated in poises and is suitable for pressures up to 20,000 psi. and temperatures of 350° F. Also can be used for testing cement slurries under simulated well conditions equivalent to depths of 18,000 to 20,000 ft. For operation the unit requires electric current of 110 volts, 60 cycles a.c. and compressed air supply of 100 psi. *Refinery Supply Co.*



IT'S NEW CHECK IT

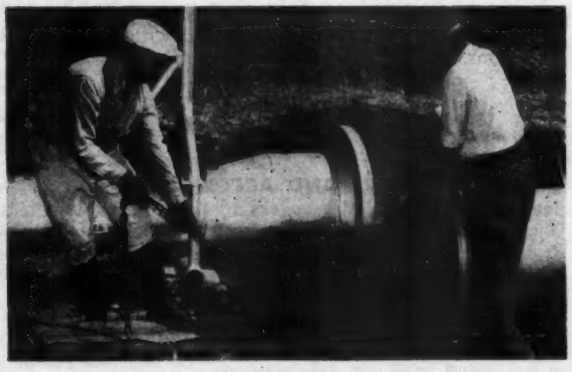
(10) UNIVERSAL EXPANSION JOINTS for use in refineries, power plants, and chemical-process plants, are capable of absorbing movement of high-temperature lines in any direction—axially, laterally, angularly, or any combination of these. Unit consists of two corrugated elements linked together by a section of pipe. The amount of lateral movement that can be absorbed by joint depends on the length of pipe between the cor-



rugated elements. Expansion elements can be either of nonequalizing type for pressures up to 30 lb. or self-equalizing for higher pressures. In catalyst lines, joint offers no sharp crevices in which catalyst can pack. *Zallea Brothers & Johnson.*

IT'S NEW CHECK IT

(11) NEW OIL-LINE SCRAPER resists oil, wear, swelling, and deterioration. Scraper is made from a series of ten 18½ by 1¾-in. Hycar American rubber disks mounted on a metal core and may be pulled from a



crude-oil pipe line after completing a 40-mile run with no damaging effects. Scraper is run through the pipe lines when excessive pumping pressures indicate the resistance of accumulated paraffin on the sides of the oil lines. *Pioneer Rubber Co.*

IT'S NEW CHECK IT

TRADE LITERATURE

(12) AXIAL AIR GAP MOTOR. A 16-page 3-color bulletin completely describes design and characteristics of new "pancake" electric motor. Description covers ver-

satility in application, features of construction, dimensions, and space and weight reductions. Illustrated. *Fairbanks, Morse & Co.*

IT'S NEW ✓ CHECK IT

(13) BENT-TUBE BOILER. New 18-page bulletin describes Class LE bent-tube boiler especially adaptable to installations where there are no space limitations. Dimensional drawings and photographs illustrate actual uses in various plants and refineries throughout the country. *Henry Vogt Machine Co.*

IT'S NEW ✓ CHECK IT

(14) V-BELT DRIVES. A 16-page 2-color catalog contains complete information on V-belt drives with combination groove sheaves for "A" or "B"-section V-belts. Drive data, sheave and belt dimensions, and sheave and belt list prices are given in easy-to-read chart forms. *Transmission Machinery Corp.*

IT'S NEW ✓ CHECK IT

(15) FLOW METERS. New 12-page 8½ by 11-in. illustrated bulletin on flow meters of the orifice type for indicating, recording, and integrating the flow of steam, gas, and air gives details of construction, data on orifice plates, etc. *American District Steam Co.*

IT'S NEW ✓ CHECK IT

(16) TUBE FITTERS MANUAL is an authoritative handbook on the selection of metal tubing circuits. Handbook makes available all basic data underlying the specialized techniques required for the design and speedy installation of long-life, leakproof systems. Seventy-six pages. Adequately illustrated with photographs, diagrams, and charts. *Parker Appliance Co.*

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(17) MANOMETERS AND ACCESSORIES. New loose-leaf descriptive bulletin covers 10 types of manometers. Typical mountings of each type are depicted by illustrations. Dimensional drawings are given for each type. *Trimount Instrument Co.*

IT'S NEW ✓ CHECK IT

(18) POCKET GUIDE TO CORROSION-RESISTANCE PROBLEMS. New tool for judging corrosion resistance of nonferrous and stainless steel alloys is in easy-to-operate slide-rule form. Guide is based upon exhaustive tests and classifies the resistance of 13 nonferrous and stainless-steel alloys in 142 corrosive applications with degrees of excellent, good, fair, and no good. Copious footnotes broaden its scope of applications to include most of the common uses and many unusual ones. *H. M. Harper Co.*

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(19) RIGHT-SIZE AIR COMPRESSOR. Selecting an air compressor of the correct size and type for any application is covered in complete treatise. New booklet simplifies and organizes data needed for the determination of size and scientific selection of an air compressor to meet any requirement, with clearly worked-out charts illustrated by examples covering many types of installations. Tables also give flow of free air through orifices of various dimensions. Installation recommendations are included, giving data for electric wire and pipe sizes. *Pneumatic Automotive Equipment Association.*

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(20) NEW PROTECTIVE - COATING CATALOG. A 12-page catalog gives complete details on the chemical and physical properties, application instructions, and other pertinent data on protective coatings for the petroleum industry. *Amercoat Division, American Pipe & Construction Co.*

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(21) SPEED REDUCERS, designed for oil-field service, are treated in four-page catalog folder. Descriptive material treats fundamentals of good design for oil-field service and lists special qualities of reducer. Specifications, and dimensions and weights table complete information. *Western Gear Works.*

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(22) NEW HEAVY-OIL BURNER of the horizontal rotary type, with a capacity of 5 to 150 gal. per hour, is described in new foldout bulletin. Several features of new burner provide a high standard of combustion efficiency, even with catalytic residual oils. Features covered are the patented Voluvalve, precision Air-Oil control, and the "Sure-Fire" ignition system. *Preferred Utilities Manufacturing Corp.*

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(23) COPPER SWEETENING PROCESS. New folder, complete with diagrams, fully explains the use and application of the Airco-Hoover copper sweetening process. This process is the original method of sweetening malodorous oils by bringing them in contact with copper chloride. *Air Reduction Sales Co.*

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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Sizing of Water and Steam Lines

TENTATIVE SCHEDULE OF TOPICS

No. 168—November 1—1. Pipe and Tubing Sizes (up to 2-in. dia.)
No. 169—November 8—2. Pipe and Tubing Sizes (2 to 4 in.)
No. 170—November 15—3. Pipe and Tubing Sizes (4½ to 5¼ in.)
No. 171—November 22—Sizing Water and Steam Lines
No. 172—November 29—4. Pipe and Tubing Sizes (5½ to 6 in.)
No. 173—December 6—Pipe and Tube Specifications
No. 174—December 13—5. Pipe and Tubing Sizes (6⅝ to 7-in.)
No. 175—December 20—6. Pipe and Tubing Sizes (7⅝ to 8⅝-in.)
No. 176—December 27—Equivalent Lengths

THE sizing of refinery oil lines was discussed in The Refiner's Notebook No. 166 of October 18, 1947.

Steam lines.—If the velocity is known, the pipe size can be determined from the simple equation:

$$Q = AV$$

in which Q is the flow in cubic feet per minute, A is the cross-sectional area of the pipe in square feet, and V is the velocity in feet per minute. It is necessary to determine the specific volume (volume per pound) from the steam tables, to convert to pounds flowing.

In power-plant practice velocities range from 4,000 to 20,000 ft. per minute and occasionally as high as 75,000 for district heating lines or where pressure drop is of little significance. The different conditions in which steam is available accounts for the ranges, thus:

Steam and service—	Velocity, ft. per min.
Low-pressure saturated steam—Very long lines	4,000-6,000
Medium-pressure saturated steam—Engines or heating	6,000-8,000
Superheated, 200 psi. and higher—Turbine leads	10,000-20,000

A formula for diameter which is used in steam power-plant practice based on a velocity of 5,000 ft. per minute is:

$$D = 0.175\ (w/d)^{1/2}$$

in which D is the internal diameter in inches, w is the pounds of steam per minute, and d is the density of the steam in pounds per cubic foot.

In refinery practice the lines are relatively small and flow rates are not uniform. Pipe size should bear some relation to the allowable velocity. Accordingly, it is not considered to be good practice to use a velocity in excess of 800-1,000 ft. per minute for each inch of diameter, although for the short lines under 300 ft. used in many refineries, velocities of 1,000-1,200 ft. per minute per inch of diameter may be permitted. Using this basis, the approximate sizes of refinery lines are shown in Table 1. Nonuniform flow conditions such as those encountered with reciprocating engines or pumps requires the use of lower steam line velocities—about 65 per cent of those shown in Table 1. Large piping involves a greater first cost, greater costs for fittings and insulation, larger heat losses or thicker insulation, and a thicker pipe wall if the pressure is high. For these reasons higher velocities and smaller diameters are being more widely used.

TABLE 1—VELOCITY IN REFINERY STEAM LINES
(Feet per minute*)

Std. pipe size	Very long lines	Regular and short lines
1½	1,500	1,800
2	1,900	2,300
2½	2,200	2,700
3	2,800	3,400
4	3,600	4,400

*For reciprocating equipment reduce the velocities by 35 per cent.

Water lines.—In sizing water lines it is common practice to limit the head loss to 2.5 ft. of head per 100 ft. of pipe. For larger lines (4-in. and larger) the rate is even further reduced to 4 or 5 ft. per second. Table 2 shows recommended flow rates for water lines based on the above limits.

TABLE 2—APPROXIMATE FLOW RATES IN WATER LINES

Pipe size	Water flow (g.p.m.)	Velocity (ft. per sec.)
½	1.1	1.2
¾	2.3	1.35
1	4.3	1.6
1¼	8.8	1.9
1½	13.5	2.1
2	26.0	2.4
2½	41.0	2.7
3	73.0	3.1
4	150.0	3.7
5	260.0	4.1
6	380.0	4.3
8	700.0	4.5
10	1,150.0	4.7
12	1,700.0	4.9
14	2,100.0	5.0
16	2,900.0	5.1
18	3,750.0	5.2
20	4,750.0	5.4

Air lines.—Refineries are usually served with two sets of air lines, one for the extremely small amount of air required for instrument controls, and another for the larger intermittent flows required for cleaning tools, acid transfer, etc. Table 3 indicates the size of lines required for air flow based on a pressure drop of about 0.2 psi. per 100 ft. of pipe length.

TABLE 3—APPROXIMATE CAPACITIES OF COMPRESSED AIR LINES

Capacity (cu. ft. per min.)	Standard pipe sizes required			
	20 lb. air	50 lb. air	100 lb. air	150 lb. air
100	1¼	1¼	1	1
250	2	1½	1½	1¼
500	2½	2	2	2
1,000	3	3	2½	2½
2,500	5	4	3½	3½
5,000	6	6	5	4

No. 171 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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THE OIL AND GAS JOURNAL
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MODERN Rotary DRILLING

Mud Data on Gulf Coast Well

THE preceding four installments of this series dealt with some of the fundamentals of the hydraulics of the circulating system of a rotary rig. Discussed were some of the steps which are being taken in order that the requirements may be met as imposed on this system by conditions and needs of present-day drilling. To complete this discussion, and for illustration and reference purposes, mud-circulation data of a Gulf Coast well are shown graphically in Fig. 49.

The drilling progress of this Gulf Coast well was normal, with no special drilling problems having been encountered. The mud weight and the mud-viscosity requirements were average. A steam rig and 4½-in. drill pipe were used.

The mud was circulated during 47.6 per cent of the over-all drilling time of the well. The time during which the mud was not circulated included such operations as round trips with bit, oiling the rig, deflection surveys, waiting on cement, and miscellaneous and repair down time.

Hydraulic horsepower data shown in the chart were calculated from measured average pressures and rates of circulation. The formula given in Installment 34 was used. To facilitate this type of calculations a chart has been prepared and is given in Fig. 50. Use of the chart is illustrated by an example thereon, and is self-explanatory. To arrive at actual power requirements, efficiency of the pump has to be considered.

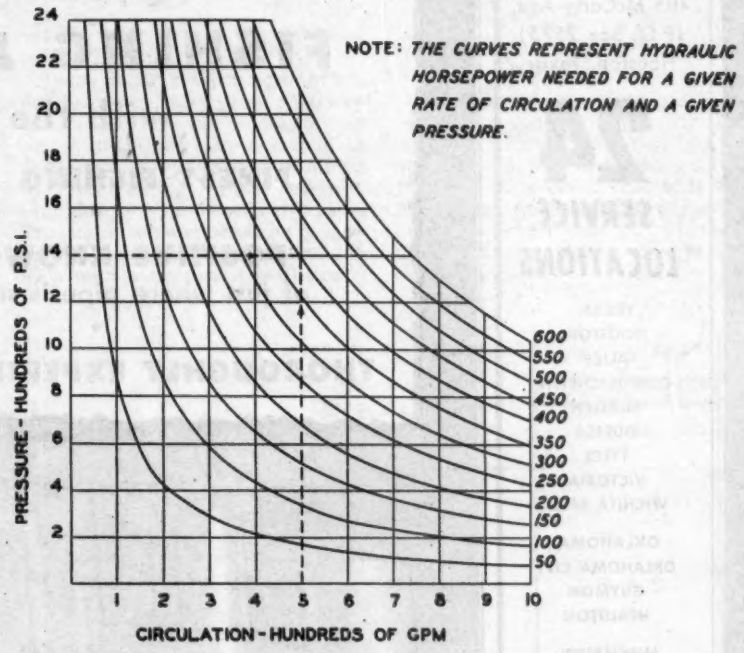

Fig. 50—Hydraulic horsepower for given pressures and rates of circulation

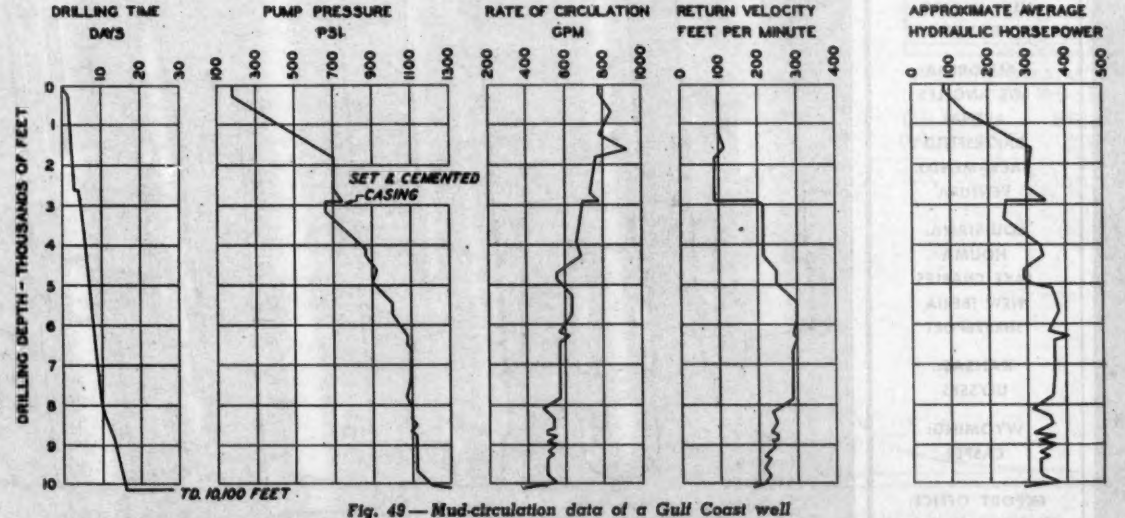

Fig. 49—Mud-circulation data of a Gulf Coast well

No. 46 in a series by Joseph Zaba, petroleum engineer, Houston

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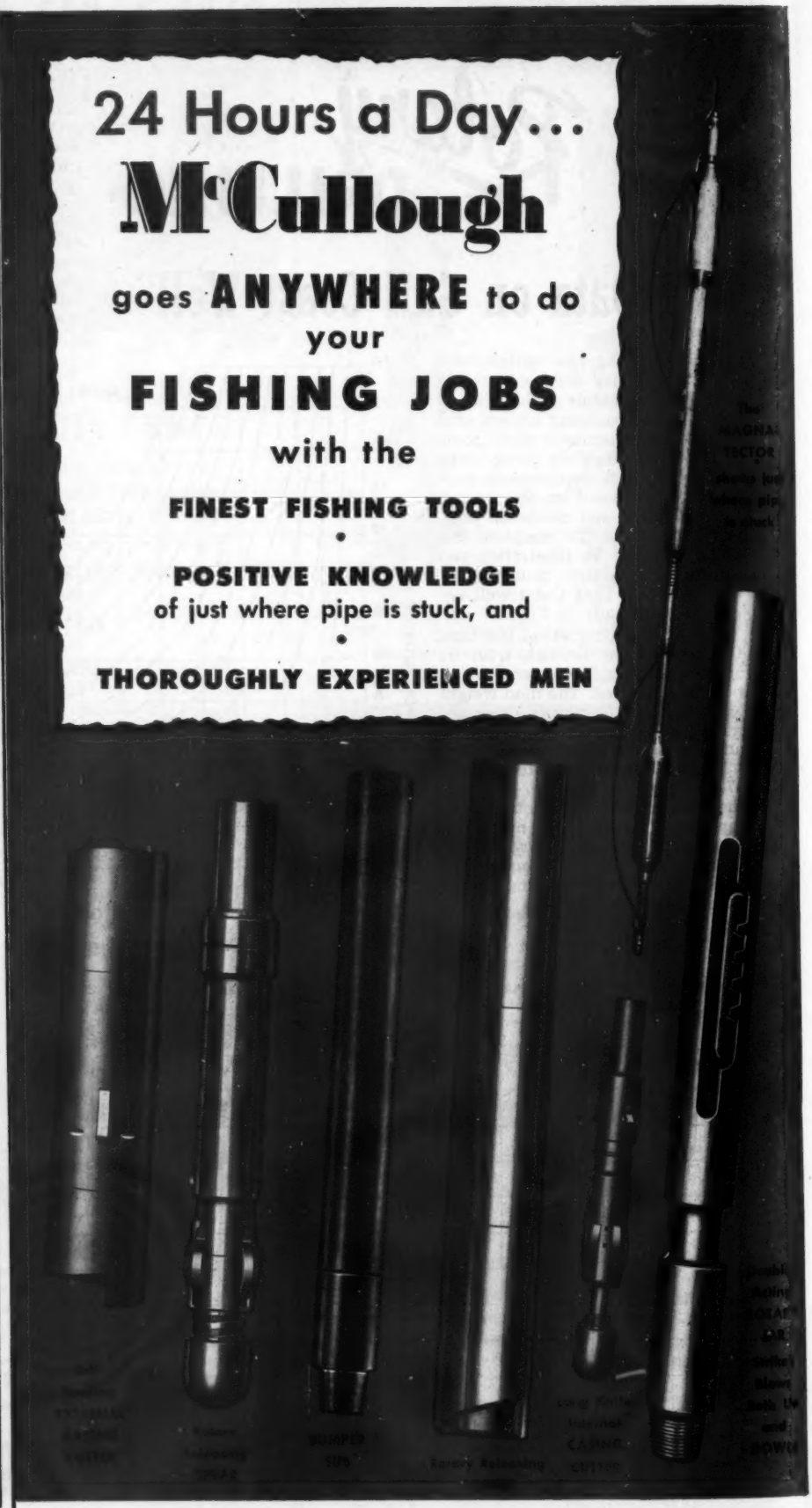


ENGINEERING fundamentals

Reservoir Volumes—Space Occupied by Stock-Tank Oil and Its Original Gas

IT is convenient for some reservoir calculations to know the space that would be occupied in the reservoir at any pressure below the original by the contents of a unit volume of original reservoir oil, or by a unit volume of stock-tank oil and all the gas which was originally in it. An explanation of this calculation will also aid in clarifying the concepts of gas solubility and formation volume factor which were defined in previous discussions.

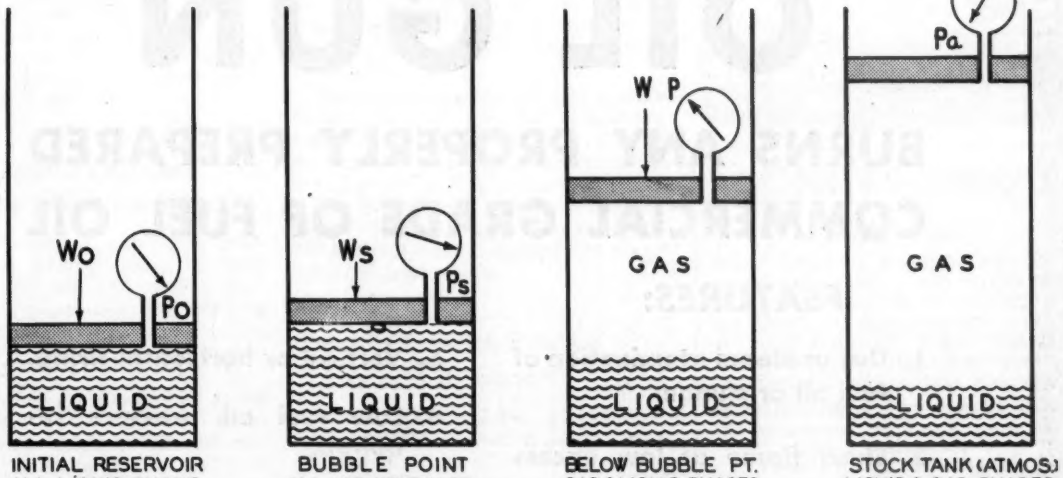
Space changes which occur when pressure is released from reservoir oil are shown in the accompanying set of diagrams. On decrease in pressure the total space occupied by liquid and gas must increase, provided no withdrawals are made. The total volume based on a barrel of stock tank oil is designated as **u** and is expressed mathematically as follows:

$$u = \beta + (r_o - r)\, v$$

Where β represents the liquid volume at a given pressure, and $(r_o - r)\, v$ represents the free gas volume at that pressure. The latter follows from the fact that r standard cubic feet of gas go into solution at the pressure considered and, therefore, of the original r_o standard cubic feet there are $(r_o - r)$ standard cubic feet remaining as free gas. At pressure P this gas volume occupies less space than at standard conditions, the conversion factor being v, previously defined as

$$\frac{14.7 \times T_r \times Z}{520 \times 5.62 \times P}$$

The units of **u** as given are barrels. The graphs accompanying the diagrams indicate the general manner in which β, r, and **u** vary with pressure. It is noted that **u** is an increasing quantity as pressure decreases regardless of whether there are two phases present or one.



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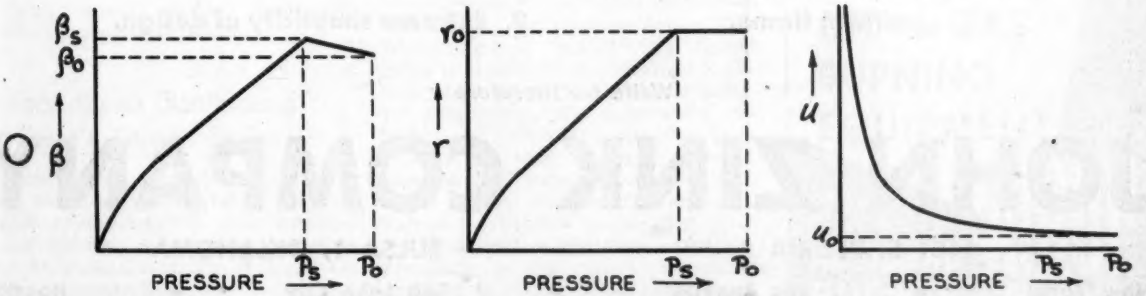
$u_o = \beta_o$ BBL.

BUBBLE POINT
ALL LIQUID PHASE
TOTAL VOLUME=
$u_s = \beta_s$ BBL.

BELOW BUBBLE PT.
GAS & LIQUID PHASES
LIQ. VOL. = β BBL.
GAS VOL. = $(r_o - r)v$ BBL.
TOT. VOL. = $u = \beta + (r_o - r)v$ BBL.

STOCK TANK (ATMOS.)
LIQUID & GAS PHASES
LIQ. VOL. = 1 BBL.
GAS VOL. = $\frac{r_o}{5.62}$ BBL.
TOT. VOL. = $\left(1 + \frac{r_o}{5.62}\right)$ BBL.



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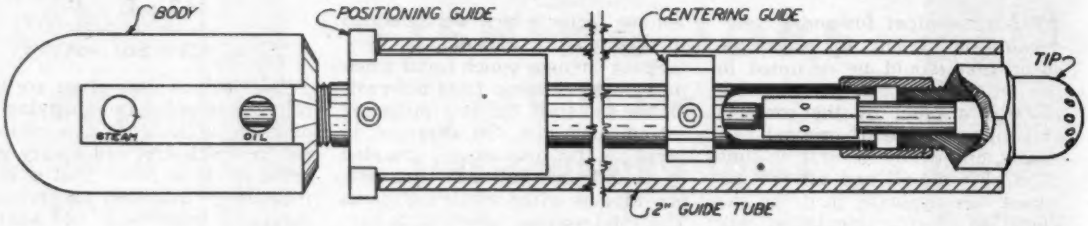

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REFINING

Standard Affiliate Buys Root Petroleum Option

Pan American Petroleum & Transport Co. has acquired an option to purchase more than a third interest in Root Petroleum Co. It is reported that if the option is exercised Pan American, a Standard Oil Co. (Ind.) affiliate, will offer to purchase the remaining stock. The third interest under consideration is that of D. P. Hamilton, Root president.

Root Petroleum operates a refinery with a daily crude capacity of 16,000 bbl. at El Dorado, Ark., and earlier this year purchased for $1,100,000 a 100-octane gasoline plant on its refinery site.

The company last year had a crude-oil production averaging 850 bbl. daily and a natural-gas production of about 1,650,000 cu. ft. daily.

It last year also owned more than 18,000 acres of undeveloped leases in Arkansas, Louisiana, Mississippi, and Texas.

Pacific Coast Products Deliveries Show Increase

Total deliveries of petroleum products in the Pacific Coast territory averaged 1,030,000 bbl. during September, a figure near the all-time record of 1,035,000 bbl. daily set during January, according to the Bureau of Mines.

Gasoline deliveries remained at the August level of 370,000 bbl. daily, while residual fuel deliveries climbed 24,000 bbl. daily to 386,000 bbl. and distillate fuel deliveries increased 13,000 bbl. daily to 113,000 bbl.

For the first 9 months of this year deliveries of all petroleum products averaged 978,000 bbl. daily, compared to 890,000 for the entire 12 months of 1946.

Total stocks during September showed a drop of 29,000 bbl.

Negotiations Continuing In Pure's Toledo Strike

Negotiations were continuing early this week in Toledo, Ohio, between labor representatives and management officials attempting to settle the 34-week-old strike at Pure Oil Co.'s Toledo refinery.

Latest suggestion under consideration was a proposal by Refinery Superintendent David S. Frank that the plant be reopened generally on the basis of the contract in force when the strike was begun.

Synthetic Rubber Output Limit Asked by Collyer

A proposal that the Government limit production of synthetic rubber to that amount necessary for stockpiling and military security was made before the House Armed Services Subcommittee in its hearing conducted in Akron, Ohio.

John L. Collyer, president of B. F. Goodrich Co., declared there should be the "widest area possible for competitive enterprise and the free play of economic forces."

The Government should, however, he said, produce the amount of synthetic material deemed necessary of such a "strategic and indispensable material."

The Akron hearing closed a 2-week inspection tour by the committee, headed by Representative Shafer, Michigan, of plants in and near Houston, Louisville, Ky., and Akron.

The Government now owns wartime plants which cost approximately $700,000,000 and have a capacity of about 1,000,000 tons a year.

Japan's Coalite Process Described in Report

In a report, "Low-Temperature Carbonization of Coal in Japan," now on sale by the office of Technical Services, Department of Commerce, Washington, the operational factors relating to the performance of low-temperature carbonization processes and the extent of the industry in Japan, are explained in some detail.

The low-temperature carbonization of coal was an important source of liquid fuels for wartime Japan. The product called "coalite" (to distinguish it from high-temperature coke) is used in Japan for domestic fuels, for gasification, for automotive vehicles, and to replace imported low-volatile bituminous coal in making metallurgical coke.

The process involves removal of a part of the volatile matter in coal by applying heat in the absence of air, according to the report. The temperature is restricted in range from 500° to 700° F. to prevent thermal decomposition of the evolved hydrocarbons.

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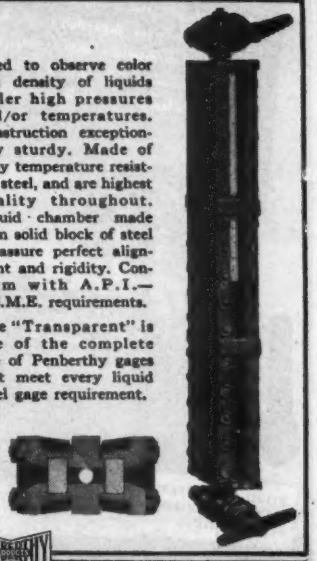

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Since 1936 one Japanese plant has produced 300,000 tons of coalite for coke blending, and about 2,000,000 tons since 1923, the report says.

Ashland Buys Government Plant at Catlettsburg

Ashland Oil & Refining Co. has purchased the government-owned refinery near Catlettsburg, Ky., from War Assets Administration for $2,150,000.

Ashland operated the plant during the war for production of 100-octane gasoline. It will be used primarily for the production of motor fuels.

WAA said the sale price covers 110 acres of land, plus production equipment and other facilities.

The plant, located 3 miles south of Catlettsburg on Big Sandy River, includes a Thermofor catalytic cracking and treating unit, an H. F. alkylation unit, and a butane isomeration unit.

Improved Method Found For Testing Jet Engines

An improved method of determining the efficiency of the performance of jet engines has been developed at the jet engine laboratories of Shell Oil Co., Inc., according to C. E. Davis, vice president in charge of manufacturing.

Davis said the method involved the collection of exhaust gases from the engine and a quantitative analysis of these gases to determine the efficiency with which the fuels have been used. This, he said, provides a yardstick for measuring the engine's performance.

In addition, Davis said, the laboratories have devised a means of running continuous tests of exhaust gases, thus providing a constant record of engine performance.

The new techniques, he added, have been made available to others interested in jet fuels.

Government Adds Synthetic Rubber Plant to Surplus

The synthetic rubber plant at Institute, W. Va., operated by the United States Rubber Co., has ceased operations and the property placed on the war surplus list of the Government.

According to plant officials a considerable number of men for standby work will be required to preserve the plant for possible future use. The House armed services committee is currently conducting hearings to determine the amount of capacity that should be retained.

The Institute, W. Va., plant was the first to turn out synthetic rubber for allied war machines.

A. P. I. Refining Division Group Chairmen Named

Chairmen of the committees of the Division of Refining of the American Petroleum Institute have been announced by Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.) and vice president of the A.P.I. in charge of refining.

The new chairmen are: H. D. Kolb, Standard Oil Development Co., training in refining committee; B. H. Barnes, Gulf Oil Corp., refinery equipment; D. B. Barnard, Standard Oil Co. (Ind.), automotive research; H. W. Field, Atlantic Refining Co., petroleum products; J. B. Rather, Jr., Socony-Vacuum Oil Co., Inc., analytical research; A. E. Miller, Sinclair Refining Co., evaluation of foreign technology; L. C. Burroughs, Shell Oil Co., Inc., disposal of refinery wastes; and K. G. MacKenzie, The Texas Co., program.

W. M. Holaday, Socony-Vacuum Oil Co., Inc., was named vice chairman of the program committee.

Consumption of Synthetic Rubber Exceeds Output

Consumption of synthetic rubber totaled 41,777 long tons during September, a total of 11,259 tons above the domestic production of the product, according to preliminary statistics compiled by the Department of Commerce.

Total natural and chemical rubber consumption was 92,299 tons, an increase of 7 per cent over August and the highest figure since April. Consumption of natural rubber exceeded imports, and this, together with the fact that synthetic rubber consumption exceeded production, resulted in a considerable over-all reduction in stocks, the department said.

Chemical rubber output of 30,518 tons during September included: GR-S, 24,111 tons; butyl, 3,465; neoprene, 2,150; and N-type, 792.

Crown Central Purchases Texas Refinery from WAA

Crown Central Petroleum Corp., Houston, has purchased from the War Assets Administration the 100-octane gasoline refinery at Pasadena, Tex., for $2,300,000. The Texas plant, which was operated for the Government during the war by Crown, was appraised by War Assets at $2,796,385. The transaction included 25 temporary and permanent buildings.

The War Assets Administration also announced the sale or lease of three other war surplus plants.

PIPE LINES

Contract Awarded for 270-Mile Sinclair Line

SINCLAIR REFINING CO. had awarded a contract to H. C. Price Co. for its 270-mile products pipe line from Houston to Arlington, Tex., near Fort Worth.

A terminal will be constructed at Bryan, Tex., where the new line will connect with the system which Sinclair has been building this year from Corpus Christi. This system has connections to serve Austin and San Antonio.

Nearly half of the pipe required for the 270-mile line has been delivered, and shipments are reported to be coming from the mills according to schedule. The line is to be coated with coal-tar enamel and wrapped with felt.

Early this week the H. C. Price organization was moving equipment to commence laying pipe for the project, which will start at the Sinclair refinery on the Houston ship channel. It is expected that the line will be completed to Fort Worth early in 1948.

It will be the third products pipe line from the Houston - Beaumont-Port Arthur refining center to the Dallas-Fort Worth marketing area.

Humble Oil & Refining Co. built the first such line in 1946, terminating it at a point between the two cities. Construction is now under way on a second, being built jointly by Magnolia Pipe Line Co. and Texas Pipe Line Co.

On the latter line, the Beaumont-Hearne section, laid by Magnolia, already has been completed, and Texas Pipe Line Co. now is laying the line between Hearne and its terminal in the Dallas-Fort Worth area.

The new Sinclair line is a part of a proposed over-all system which will connect Kansas City, St. Louis, and Chicago and will link the Gulf Coast with Sinclair's Marcus Hook, Pa., refinery.

Cities Service to Build Drumright Crossover Line

Cities Service Gas Co. has let a contract for the construction of a new cross-over line from a point near Guthrie, Okla., on the company's Oklahoma City line to the Drumright compressor station in Creek County, to bring additional gas from the west to the east side of the company's pipe-line system. The cross line will consist of 12 miles of 16-in. and 34 miles of 12-in. and is estimated to cost near $881,000.

Other work now under construction by Cities Service Gas Co. includes:

The Cimarron River project, which is nearing completion, and the river crossing being prepared for tying in. The Mulhall - Drumright cross - over

SITE OF KENTUCKY RIVER CROSSING OF T.G.T.

Shown here is the site of the Kentucky River crossing, near Winchester, Ky., of Tennessee Gas Transmission Co.'s 82-mile main-line loop. The 26-in. pipe is being laid by Anderson Brothers

CRC

PIPE LINE CONSTRUCTION EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston-Tulsa

ANDERSON BROTHERS CORPORATION
Pipe Line Contractors
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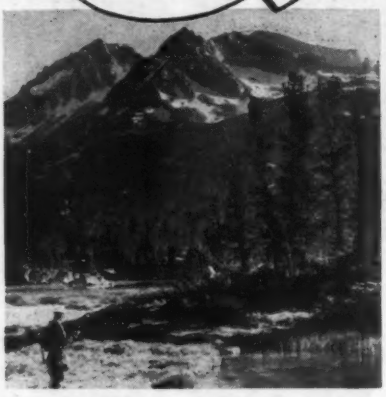
VACATION FROM PIPE CORROSION WORRIES



There's an easy way to get rid of pipe corrosion worries. Before you place steel pipe in underground service, call in Pipe Line Service engineers to protect it for you.

Once the type of protection is selected, your worries are over because these specialists have the experience and facilities to assume all responsibility and handle all details for you —right down the line.

Six strategically located plants provide pipe cleaning, priming, coating and wrapping—furnishing all materials and equipment to specifications. This avoids any division of responsibility and takes all the headaches out of protecting your lines.

It will pay you to get the complete facts today.

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Sparrows Point, Maryland

line leads from the Cimarron River to the station.

Both the Kansas City and the St. Joseph 16-in. lines north from Neosho River, a distance of about 15 miles each, which are being reconditioned.

Phillips' Loop Contract Awards Total $1,560,000

Phillips Petroleum Co. has awarded contracts totaling $1,560,000 for the construction of its 104 miles of 8-in. looping between Borger, Tex., and Richmond, Kans.

Construction of 54 miles on the eastern half of the line has been awarded to Deaton & Sons, Sharpe, Kans., at $810,000.

Construction of the 50 miles of loop lines for the western half has been awarded to Vaughn & Taylor, Inc., Spearman, Tex., at $750,000.

Texas Eastern Acquires Big Inch System Title

Texas Eastern Transmission Corp. November 14 acquired from the Government its title to the Big Inch pipe-line system.

The transaction followed final payment by the operating company, made in full, completing the deal begun in February when Texas Eastern topped all other bidders on the transportation system with a high bid of $143,127,000. The company previously had made payments of $4,000,000 and $1,000,000 which were returned by War Assets Administration.

The lines were constructed by the Government during the war to transport petroleum products from refineries to Philadelphia and New Jersey.

Company officials expect the lines to be delivering 265,000,000 cu. ft. of natural gas per day by December 1, with deliveries to be boosted by next August 1 to 433,000,000 cu. ft. a day, through the installation of additional compressor stations.

The company already has arranged gas-sale contracts with seven companies covering a maximum of 417,000,000 cu. ft. a day. Consolidated Natural Gas Co. and Columbia Gas & Electric Corp. have contracted for about two-thirds of the amount, and Consolidated holds an option to increase the amount it takes by 75,000,000 cu. ft. a day.

Cost of gas to Texas Eastern under contract is to be 7.6 cents per 1,000 cu. ft., with a delivered price to firm customers of 27.72 cents and a price to interruptible consumers somewhat lower.

The acquisition of the Big Inch system carries with it the provision that the company must maintain the lines so that they would be able to pump crude oil on 90 days' notice at any time during the next 20 years if an emergency should arise.

PENBERTHY
DROP FORGED STEEL
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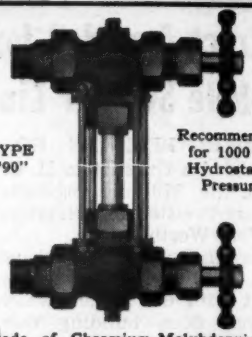

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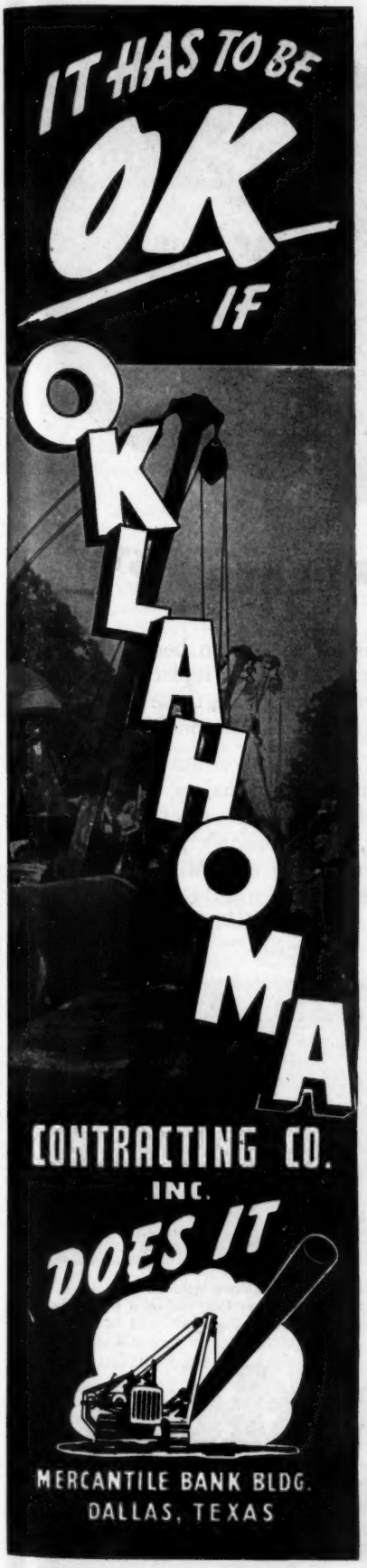

New Standard Adopted For High-Test Line Pipe

One of the most important developments in the technical committee sessions at the recent meeting of the American Petroleum Institute was the adoption of a new standard specification, 5LX, for high-pressure test, high tensile strength line pipe in sizes of 6⅝-in. o.d. and larger.

The adoption was made by the Joint Committee on Standardization of Oil Country Tubular Goods, under the chairmanship of H. W. Ladd, Stanolind Oil & Gas Co.

The new specification is expected to fill a need created by the great expansion in pipe-line construction and modern pipe-line engineering practices.

"Biggest Inch" Gas Line Opened in Ceremonies

Operation of the $70,000,000 "Biggest Inch," a 26 and 30-in. pipe line extending from the Permian basin of New Mexico at El Paso to Santa Fe Springs, Calif., was officially inaugurated last week when Lt. Gov Goodwin Knight of California opened a valve in Santa Fe Springs that allowed gas to flow into the Southern California Gas Co. distribution system.

More than 300 industrial and civic leaders were present at the ceremonies in addition to representatives of the Southern California Gas Co., Southern Counties Gas Co., and El Paso Natural Gas Co., of which the first two companies compose the Pacific Lighting Corp. group.

From the Permian basin a 26-in. line will deliver 175,000,000 cu. ft. of gas daily through Blythe, Calif., from which point the line is of 30-in. diameter to Santa Fe Springs, a distance of 241 miles. The total distance of the line is approximately 1,200 miles.

Construction of the 241-mile stretch of 30-in. line from Blythe to Los Angeles is believed to have been the largest lump-sum contract ($4,000,000) for a pipe-line construction project in the United States. It was contracted by H. C. Price Co.

A further extension of the line is expected to be constructed from El Paso to Dumas, Tex., which will increase the potential output to 305,000,000 cu. ft. daily by November 1948. Work on the new extension is expected to begin by February 1948.

The Blythe-Santa Fe Springs line is the first 30-in. high pressure gas-transmission line ever constructed and initiates a trend in pipe-line economics toward lines of 30 in. and larger for both natural gas and petroleum.

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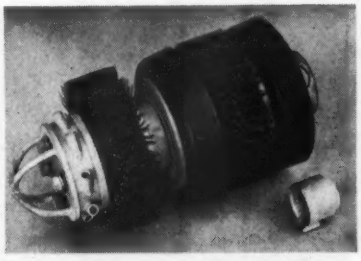

8" TYPE RC PIPE LINE PIG*
The "Jet Rotation" Scraper

Body Cap (in foreground) is installed when Pig is used for:
- Line displacing
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Type RC Pigs are available in sizes 6" to 26", for crude and products pipe lines.

*Patent pending.

THE PIG WITH THE POKE CLEANS PIPE LINES
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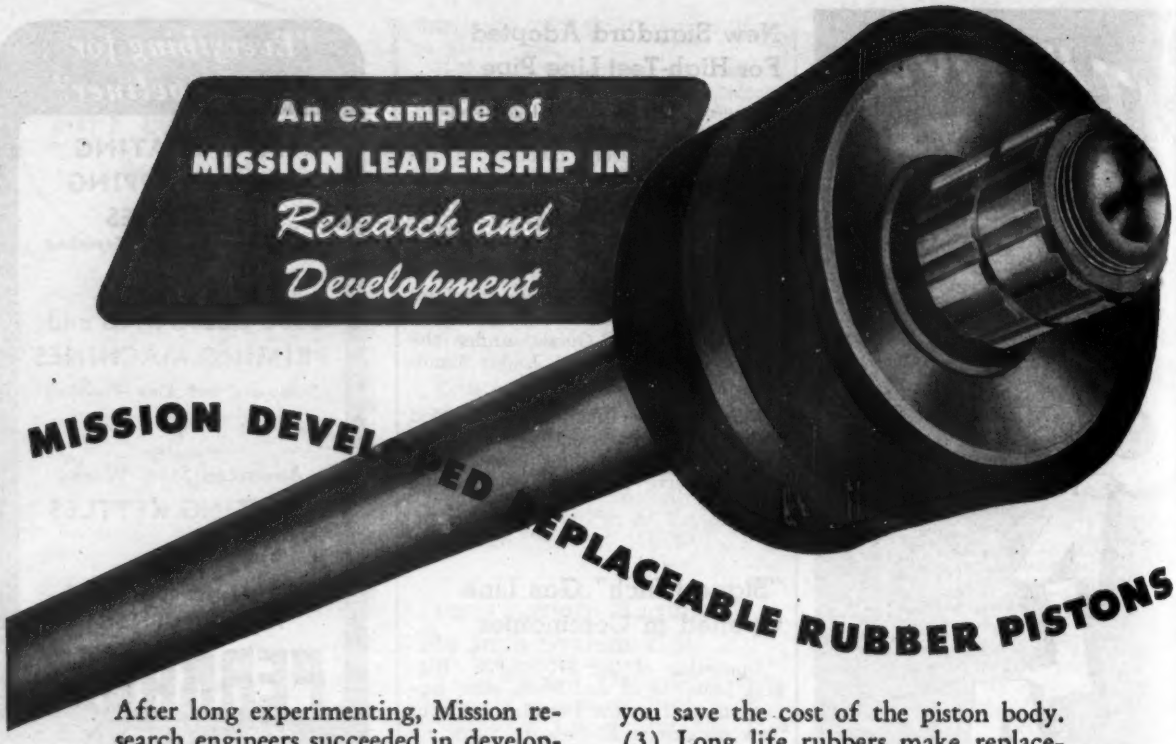
An example of
MISSION LEADERSHIP IN
Research and Development

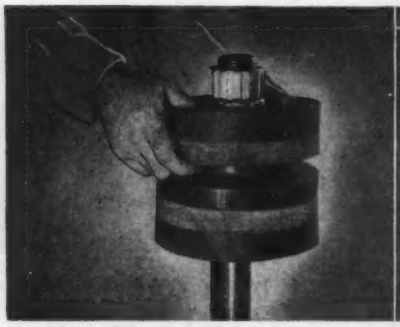


MISSION DEVEL ED EPLACEABLE RUBBER PISTONS

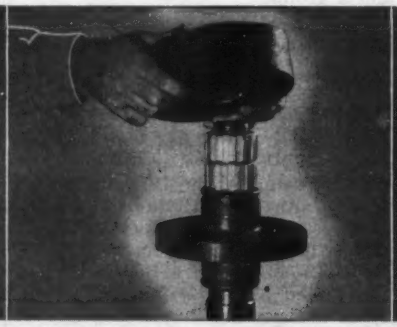
After long experimenting, Mission research engineers succeeded in developing the first really serviceable piston with replaceable rubbers. In fact, Mission succeeded so well that the Mission Piston quickly became the standard of the industry.

With Mission you reduce piston renewal costs three ways: (1) It's easier to replace piston rubbers only because you don't have to remove the piston from the rod. (2) It's cheaper because you save the cost of the piston body. (3) Long life rubbers make replacement less frequent. This means there is less shut-down time when Mission Pistons are used.

Outstanding preference by majors, independents, and drilling contractors the world over, and Mission's guarantee, are your assurance that Mission Pistons are the most economical on the market to operate . . . *"Change the rubbers and save the piston."*



When the rubbers are worn, simply remove the old rubbers and save the piston body.



It's not even necessary to remove the piston from the rod. This saves you shut-down time when the rubbers are changed.

New Mission Rubbers installed and piston is ready for another long run at a fraction of the cost of a new piston.

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Mission Pistons

NATURAL GAS

N.G.A.A. Amarillo Meeting Is Set for December 12

Liquefied petroleum gas manufacture and water softening in the Texas Panhandle will be featured at the first regional meeting of the Natural Gasoline Association of America, that of the Panhandle-Plains region, which will be held in Amarillo, Tex., December 12.

This meeting initiates the newly devised meetings plan of the N.G.A.A. to consider problems that are regional and are of paramount importance only to limited areas or districts

These meetings will take the place of the plant operators' meetings formerly sponsored by the association, according to N.G.A.A. President C. R. Williams.

B. R. Carney, Shamrock Oil & Gas Corp., Amarillo, has been named chairman of the program committee for the Amarillo meeting. The principal speaker will be Colonel Thompson of the Texas Railroad Commission.

Cities Service Authorized $1,490,683 Expansion

The Federal Power Commission has approved Cities Service Gas Co.'s request for authority to construct additional facilities to obtain sufficient gas supplies for the next 2 years.

Facilities authorized and estimated at $1,490,683 include 10.5 miles of 16-in. line into Grady County, Oklahoma, to reach the source of supply which will be obtained from Consolidated Gas Utilities Corp.; a 47-mile stretch of 16 and 12-in. line to extend from near Guthrie, Okla., on the company's main Wichita-Oklahoma City line on the west side of the system; and about 15½ miles of 16-in. line to replace and shorten about 19 miles of its Tallan-Hogshooter 12-in. line.

The addition gas supply has been contracted with the Oklahoma Natural Gas Co., Consolidated Gas Utilities Corp. and producers in the Hugoton area in Kansas to obtain up to 130,000,000 cu. ft. of gas per day.

The company will abandon 19 miles of 12-in. pipe line and all interconnected facilities lying south of its Drumright compressor station.

Because of the material shortages it is expected that only a part of these facilities will be placed in operation by the 1948-49 winter season.

The commission turned down the recommendation of the presiding examiner that the Oklahoma Natural Gas Co. be exempted from requirements of the Natural Gas Act for the contracted 2-year period of its deliveries to Cities Service.

East Ohio Held to Be Natural-Gas Company

WASHINGTON.—The Federal Power Commission has reaffirmed an order of June 25, 1946, holding East Ohio Natural Gas Co. to be a natural-gas company within the meaning of the Natural Gas Act.

In a recent ruling the commission rejected the company's contention that its approximately 650 miles of large-diameter pipe line are facilities used for local distribution only.

East Ohio had contested the 1946 order, which required the filing of a statement of the original cost of properties, the reclassification of accounts in accordance with commission procedure, and the filing of annual financial and statistical reports, which it claimed would cost more than $1,500,000.

Experimental Plant Uses Lignite as Fuel Gas Source

Experimental work just completed by the U. S. Bureau of Mines in a pilot plant at Grand Forks, North Dakota, shows that more than 900 billion tons of lignite in three western states is a potential source of fuel gas. The unit represents the first full-scale successful attempt to manufacture water gas from lignite and subbituminous coal by a continuous process in an annular vertical metal retort. Water gas with a heating value of 300 B.t.u. per cubic foot was produced from natural lignite. The over-all efficiency of the pilot plant was 72 per cent extraction of the total fuel energy in the lignite processed.

Lignite reserves of North Dakota, Montana, and South Dakota add up to about 915 billion tons and constitute about 98 per cent of the country's total lignite reserves. Lignite itself represents nearly one-third of America's total solid fuel reserves, which include all grades of bituminous and anthracite coal. However, difficulties of using lignite as a fuel have resulted in a low annual production rate. Lignite generally contains 30 to 40 per cent moisture, and when dried in air, the coal slacks and ignites, making it difficult to store for long periods or to ship to distant points of consumption. Lignite usually has a heating value about half of that of the best bituminous coal.

The Grand Forks gasification pilot plant was put into operation following similar experiments on a smaller scale at a pilot plant at Golden, Colo.

A copy of the new Report of Investigations 4128, "Gasification of Lignite and Subbituminous Coal, Progress Report for 1945-46" can be obtained by writing to the Bureau of Mines, Publications Section, 4800 Forbes St., Pittsburgh, Pa.

Company Reduces Rates

The Federal Power Commission has approved the revised rate schedule whereby wholesale customers of Hope Natural Gas Co. in Ohio, Pennsylvania, and New York will benefit by a cumulative total saving of $231,865, effective as of September 1.

Natural Gasoline

Columbia Completing Six Propane Plants

Early completion is expected by Columbia Gas & Electric Corp. of six propane plants in Ohio, western Pennsylvania, New York, and West Virginia.

The plants, being built at a cost of about $2,000,000, will transform liquid propane or butane into a vapor to be mixed with natural gas during peak demand periods to help maintain adequate gas pressures.

Hiwan Natural Gasoline Plant to Operate Soon

Hiwan Oil & Gas Co.'s natural-gasoline plant in Atlanta field, 15 miles east of Magnolia, Ark., is expected to go into full operation soon. It began test production only recently.

The plant was designed to process 10,000,000 cu. ft. of gas daily for production of 35,000 gal. of natural gasoline and liquefied petroleum gas.

Fifty-three wells in Atlanta field serve the plant, which sells its gasoline to Lion Oil Co., El Dorado, Ark., and its liquefied gas to Paxton & Wright, El Dorado.

Hunt Installs Absorber

Installation of an additional absorber at the H. L. Hunt Oil Co. plant in Whelan gas-distillate field in northwestern Harrison County, East Texas, has been announced. The additional unit was moved from a location in the Long Lake area of Anderson County, southwest of Palestine. Delta Construction Co., Houston, is the contractor.

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Exploration and Drilling

The A.A.P.G. Research Program

THE proposed fundamental research program in sedimentology of the American Association of Petroleum Geologists moved a long step forward at the American Petroleum Institute meeting last week. Of the three stages which any proposed research project must pass with approval, the geologists' program successfully passed the first two.

The first, and perhaps most difficult, began formally on Saturday, November 8, when the program was presented to a special advisory committee of the main A.P.I. committee on fundamental research on occurrence and recovery of petroleum. Here the program as originally submitted was checked and rechecked, not only from the scientific angles, but from administrative practices; screened as to the research that in part or in whole is now being carried on, or should be carried on by individual companies.

When it emerged from that screening and checking, it had been examined from every angle by some of the top scientific brains of the industry; not merely geological experts, but experts in all branches of science.

Naturally what emerged was in slightly different form from that originally submitted. Essentially what remained was a program for research in sedimentology, built around A.A.P.G. Project 5, namely a study of recent and near-recent sediments. At least for the time being, the A.P.I. screening committee decided that ancient sediment work should be left to individual companies. This did not mean, however, that all projects except 5 had been rejected. For administrative and other reasons, various portions of the other projects, as originally separated, were to be incorporated around an over-all broad study, of which original Project 5 would be only the core.

With this favorable report from the special committee, the next stage was the main advisory committee. Further discussion, explanation, screening, and checking took place. It was conceded that the program would involve an expenditure of at least $200,000 per year for several years. The final decision of this main committee was a resolution to be sent to the research committee of the board of directors of the A.P.I.

In effect the scientific committee's resolution said that here was a good research program, 'but one which would involve far more money than anything heretofore handled. If the representatives of the board of directors were willing to consider a project of such magnitude, they could so signify by approving two proposals of the chief scientific committee. These would involve, (1) appropriating $5,000 from the 1947-48 contingent funds, and (2) include in the regular 1948-49 budget an additional $5,000. This $10,000 would be used to prepare specific research projects according to the usual Institute procedure.

In other words, the scientific committee said there was no use spending a lot of money preparing specific projects for consideration, if the total program was too big. On the other hand, if the total amount of money was not too big, approval in principle by the board's committee did not constitute advance approval of any specific project.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN.—West side of the Elk Basin field probably will have a new pool in Seaboard-Resolute test which found oil in the Embar. Stanolind-Orchard discovery in Tensleep in old Torchlight field flowed 1,632 bbl. of 35.2°-gravity oil in preliminary test. General Petroleum's recent Sand Creek discovery in Washakie County is being extended ½ mile west in second well which flowed from Frontier sand. The first well drilled on the Southern Ute structure in northwest New Mexico in 25 years is showing for a gasser in the Dakota.

CANADA.—California Standard-Imperial 1 Bantry, important strike in southern Alberta, produces 24°-gravity crude from Lower Cretaceous to become a prospect of being one of the best oilers in the plains area.

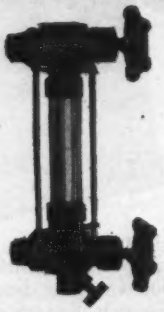
OKLAHOMA.—Deep Shell well 4 miles south of Elk City, Beckham County, opens gas-distillate production in "big trough" of Anadarko basin. New pay zone opened in southeast Little River area, Seminole County, by Keener Oil & Gas Co.'s 200-bbl. well.

NORTH TEXAS.—Ellenburger discovery in northeastern Comanche County swabs 50 bbl. of oil per day. Grayson County discovery offset has shows of oil.

WEST TEXAS.—Slick-Urschel Oil Co. 1 D. L. Alford-Plymouth, deep Sutton County distillate prospect, will be deepened to 12,000 ft. before further testing, after fifth attempted drill-stem test failed mechanically. Crane County wildcat hits water table and will continue to the Ellenburger.

SOUTHWEST TEXAS.—Comanche Corp. 1 Studor, wildcat approximately 1 mile northwest of Robstown in Nueces County, is reported to have flowed 65 bbl. of oil per day through perforations at 5,046-54 ft., total depth is 8,001 ft.

PENBERTHY
"ALL IRON"
LIQUID LEVEL GAGES



Body made from a special high strength alloy iron, shanks alloy steel and trim stainless steel. Extra heavy construction throughout, automatic and positive shut-off if glass breaks, heavy duty stuffing boxes. Conform with A.P.I.—A.S.M.E. requirements.

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APPALACHIAN FIELD

No Oil Shows Found In Maryland Wildcat

PITTSBURGH.—In Section 8, Garrett County, Maryland, Columbian Carbon Co. topped the Oriskany sand at 4,695 ft. in the important wildcat on Willis J. Durr farm with a lime break in the sand at 4,717-32 ft., and at 4,741 ft. there had been no showing of oil, gas or water. The top of the lime was at 4,559 ft. and the chert at 4,569 ft. The gas struck in the chert at 4,587-90 ft. has materially decreased.

On Chestnut Ridge in Georges Township, Fayette County, southwest Pennsylvania, New Penn Development Corp. et al topped the Oriskany sand at 7,320 ft. in No. 2 Mary I. Smith, considerably lower on structure than the No. 1, which was the largest gas well on the ridge. At 7,355 ft. the gas from the Onondaga chert gages 264,000 cu. ft. with no showing so far in the Oriskany. Here, Orville Eberly et al topped the Tully lime at 6,390 ft. in the test on the Albert J. Opperman, an offset to the good Oriskany well on the Hartman farm.

In Springfield Township, Fayette County, Peoples Natural Gas Co. topped the Onondaga lime at 7,634 ft. in the wildcat on Allie May Martin farm and the chert at 7,657 ft. Casing will be set at 7,661 ft. It is running low.

New locations in southwest Pennsylvania totaled 7 and in South Bend Township, Armstrong County; Clarion Township, Clarion County; Washington Township, Indiana County; Franklin Township, Greene County; Allegheny & Bell townships, Westmoreland County.

On Briery anticline in Portland district, Preston County, West Virginia, Wm. E. Snee, Orville Eberly et al topped the Corniferous lime at 5,449 ft. in the test on Virginia Cuppett farm and the chert at 5,471 ft., which, from a surface elevation of 2,137 ft., places the chert at minus 3,334 ft. or about 58 ft. higher on structure than the good chert gas well on Cora E. Lewis farm. Casing has been set and drilling resumed.

In Shady Springs district, Raleigh County, Godfrey L. Cabot, Inc. is drilling a deep test on the Russell & Doloff lease, now at 6,209 ft. and nearing the lower Devonian.

New locations totaled 30 and in Otter and Salt Lick districts, Braxton County; Washington district, Calhoun County; Southwest district, Doddridge County; Nuttall district, Fayette County; Ravenswood district, Jackson County; Elk and Louden districts, Kanawha County; Harts Creek district, Lincoln County; Big Creek district, McDowell County; Union district, Marion County; Curry district, Putnam County; Trap Hill district, Raleigh County; Clay & Grant districts, Ritchie County; Geary district, Roane County; Fetterman district, Taylor County; Washington district, Upshur County; Grant district, Wayne County; Union and Walker districts, Wood County.

SOUTHWEST PENNSYLVANIA SUCCESSFUL WILDCATS

Washington County, North Strabane Township: A. J. Wise et al 1 W. W. Withrow, 273,000 cu. ft. gas, Salt sand, TD 1,335 ft.

Peters Township: P. L. & S. C. Wally 1 Lewis Groznik, 400,000 cu. ft. gas, Salt sand, gas at 1,206 ft., TD 1,206 ft.

SOUTHWEST PENNSYLVANIA WILDCAT FAILURE

Washington County, Fallowfield Township: Jerry Billen et al 1 John R. Ross, dry, Fifth sand, TD 3,009 ft.

WEST VIRGINIA SUCCESSFUL WILDCAT

Ritchie County, Clay district: E. C. Hartman et al 1 Ellsworth Buck, 5 bbl. Maxton sand, TD 1,871 ft.

WEST VIRGINIA WILDCAT FAILURES

Gilmer County, Troy district: Mudlick Oil & Gas Co. 1 Talbott & Heckert, dry through Injun sand, TD 1,800 ft.

Jackson County, Ripley district: West Virginia Gas Corp. 547 J. A. Taggart, dry, plugged; elev. 683 ft., Corniferous lime 4,812 ft., Oriskany 4,912 ft., gas 4,927 cu. ft. which after shot increased to 200,000 cu. ft., TD 4,985 ft.

Ritchie County, Clay district: P. O. Burgy 1 M. S. Riggs, dry, through Injun sand horizon, no sand TD 2,067 ft.

TEXAS GULF COAST

Deeper Wilcox Found In Hord's Creek Field

HOUSTON.—A new deeper Wilcox zone sand in Hord's Creek field, Goliad County, has been opened by Brown & Wheeler 1-W J. R. Kauffman, located in the P. Trevino Grant. The new zone was perforated at 8,322-27 ft., where the well flowed gas-condensate for 10 hours before tool was closed. The upper sand has been perforated for a dual completion. Total depth is 8,650 ft., with 7-in. casing set to 8,104 ft. Luling sand was topped at 7,975 ft.

Recoveries of oil-cut mud on drill-stem tests in the Yegua zone attracted considerable attention to the H. R. Smith & W. C. McBride Inc. & Atlantic Refining Co. 1-B W. A. Stockton, as it advanced toward the Wilcox zone, which is expected to be reached somewhere around 7,500 ft. This well is in Goliad County, near the Karnes County line, 2 miles southwest of Charco, in the extreme southeast corner of Victor Blanco grant. The drill-stem test at 4,591-4,602 ft., open 3 minutes, developed 15 psi. working pressure and recovered 270 ft. of oil-cut mud, bottom-hole pressure 800 psi. open and 840 psi. closed. A test just below at 4,601-18 ft., open 15 minutes, developed 16 psi. working pressure and recovered 30 ft. of mud and 120 ft. of oil-cut mud, bottom-hole pressure 400 psi. open and 1,340 psi. closed.

Kirby Petroleum Co. 3 Kirby Petroleum Co. fee Tract 20, second oiler for the Jergins field in Chambers County, gaged 147.97 bbl. of 37.5°-gravity oil daily through a ⅛-in. choke with 1,050 psi. flowing pressure on tubing and 1,150 psi. casing pressure. Production is from the Frio sands at 6,417-40 ft. with perforations at 6,420-26 ft. Gas ratio was 811.

Standard Oil Co. of Texas 1 Hartberg Lumber Co., wildcat test in the Gist discovery area of Newton County, ⅝ mile southwest of Brown & Standard 1 Hankamer discovery, tested through perforations at 5,617-19 ft. in Frio sands. The well flowed for 10 hours through a ⅛-in. choke and gaged 13 bbl. of oil with 1,800 psi. pressure on tubing. In 14 hours using a 7/64-in. choke the well gaged 19 bbl. of oil with 1,850 psi. tubing pressure. A previous test of the Frio sands with perforations at 5,612-16 ft., flowed at the rate of 1,500,000 cu. ft. of gas with some clear distillate and 1,400 psi. pressure. Total depth is 7,181 ft. with Hackberry sands at 7,169-81 ft. An initial test with perforations at 7,169-72 ft. (Hackberry sands) flowed 72 bbl. of condensate along with 3,300,000 cu. ft. of gas per day through a ¼-in. choke and 2,595 psi. flowing pressure.

Of the 39 new locations reported this week 14 were wildcats, 2 each in Fort Bend, Harris, Live Oak and Wilson, and 1 each in Brazoria, Jefferson, Liberty, San Jacinto, Victoria, and Wharton counties. One new pay was opened in West Bernard pool, Wharton County, while 8 wildcats were failures, 2 each in Jefferson and Wharton, and 1 each in Brazoria, Burleson, Karnes, and Live Oak counties.

TEXAS GULF COAST SUCCESSFUL WILDCAT

Wharton County: New gas-condensate pay in West Barnard—Tide Water Asso-

ciated Oil Co. 1 C. B. Stephens, in J. M. Rose Heirs Sur., 6 mi. SE of Lissie townsite, TD 7,839 ft., top sand 7,680 ft., perf. 7,680-96 ft., IP: 3,380,000 cu. ft. gas per day through a 12/64-in. choke, and 8 bbl. condensate per day per million cu. ft. of gas, TP 3,090 psi., CP 3,205 psi., 49°-gravity, no water.

TEXAS GULF COAST WILDCAT FAILURES

Brazoria County: General Crude Oil Co. 10 Belle H. Wisdom, in Abraham Darst Sur., Lot 8, Block 102, dry, TD 5,164 ft.

Burleson County: Kerns Drilling Co. 1 E. M. Bracey, in Jas. Lastley League, ½ mi. NW of Somerville townsite, dry, TD 640 ft.

Jefferson County: H. B. Hebert et al 1 Anna Wolfson et al, in T&NO Sur., 6 mi. SE of Stowell, dry, TD 11,004 ft.

Warren Pet. Corp. 1 M. I. Janes, in Manuel Chirino Sur., 2 mi. E Fannett townsite, dry, TD 9,227 ft.

Karnes County: Southern Minerals Corp. 1 Bryan Campbell, J. R. Baker Sur., 3 mi. SW of Deweesville, dry, TD 5,185 ft.

Live Oak County: Continental Oil Co. 3 Somerset Land & Cattle Co., Victoria Chapa Sur. 304, 15 mi. SW of Geo. West, dry, TD 10,725 ft.

Wharton County: J. B. Ferguson et al 1 G. E. Tripulas et al, in Spanish Camp area, in S. F. Austin League 1, dry, TD 3,852 ft.

The Texas Co. 97-B Pierce Estate, North Withers area, ETRR Sur., dry, TD 7,271 ft.

MISSISSIPPI

Completion of Gulf Wildcat Is Delayed

JACKSON.—Gulf Refining Co. 1 L. L. Majors, 29-6n-11w, wildcat at Ovett in Jones County, has been delayed in making final completion tests by packer trouble. Initial tests had indicated the packers were leaking, and the crossover packer was pulled and redressed. It has been rerun to 12,000 ft. and well washed with 290 bbl. of oil. The wash-oil is now being flowed back at the rate of 15 bbl. per hour through the casing.

Southwest of 1 Major, Gulf 1 B. L. Sholar, 30-6n-11w, Jones County, drilling below 5,705 ft. in chalk. Top of chalk at 5,542 ft., with first occurrence noted in samples from 5,550-5,560 ft.

In the Heidelberg Graben area, Danciger Oil & Refining Co. 1 C. J. Simmons, 36-1n-12e, has been completed as dry after failure to obtain a satisfactory result on test of several Comanche sands. The last zone tested, from 8,398-8,410 ft., yielded 3,700 ft. of salt water in 2 hours, and after squeezing the hole was plugged at 5,000 ft.

Danciger 1 George Simmons, south offset to 1 C. J. Simmons, is drilling below 7,128 ft. after running Schlumberger to 6,952 ft. in upper portion of the Comanche, which indicated the Massive sand to be 131 ft. higher than on 1 C. J. Simmons.

The 4 new locations reported this week included Heidelberg field's first twin-well location, 2 for La Grange field in Adams County and 1 wildcat in Adams County. There were 7 producers completed in proven areas and 5 dry holes, of which 2 were wildcats, 1 each in Humphreys and Sharkey counties.

MISSISSIPPI WILDCAT FAILURES

Humphreys County: L. F. Wall 1 C. B. Box Estate, SW SW 23-14n-4w, dry, TD 4,516 ft. Schlumberger tops: Selma 3,414 ft.

Sharkey County: Harris Drilling Co. 1 Theresa Hand, NE SE 27-10n-7w, dry, TD 4,368 ft. Top Wilcox 2,103 ft., Midway 3,440 ft., gas rock 3,890-3,912 ft., Tuscaloosa 3,950 ft., Comanche 4,237 ft.

ALABAMA WILDCAT FAILURE

Choctaw County: Hunt Oil Co. 1 M. Dubose, NE SW 18-9n-3w, dry, TD 5,103 ft.

MICHIGAN

Garfield Field Gets 540-Bbl. Producer

SAGINAW.—While recording 20 new locations, Michigan oil and gas operators maintained their brisk pace with 27 completions in the past week. Activities were marked as usual by a high number of dry holes, the completions report showing 15 of them, including 11 wildcats, while there were 7 oil and 5 new gas wells. In only one of the wildcats was there an oil show. That was in Edenville Township of Midland County. Acidizing of the well was unsuccessful and the test was abandoned. Two others were shallow drillings, the one in Leelanau County being abandoned at 400 ft. when the tools were lost in the hole.

Another heavy producer in the Garfield field of Newaygo County led the list of new producers. It came in at 540 bbl. a day. Other producers were a 113-bbl. completion in Isabella County, a 25-bbl. well in Akron Township, Tuscola County; three Bay County wells for combined initial of 130 bbl., and a 25-bbl. well in Van Buren County.

Five of the 20 new locations are in the Garfield field, 4 in Allegan County, 3 in Bay County, 2 in Oscoda, 1 each in Isabel, Saginaw, Ottawa, Van Buren, Genesee and St. Clair.

MICHIGAN WILDCAT FAILURES

Arenac County, Mason Township: J. E. Bauer 1 Wesley Bruce, SE SE SW 16-20n-5e, dry in Dundee, TD 2,934 ft.

Standish Township: Frank E. Roush 1 Charles Chaltraw, SW NW NW 36-18n-4e, dry in Dundee, TD 2,943 ft.

Cheboygan County, Ellis Township: C. L. Maguire, Inc. 1 F. and A. Brasseur, NE NE SW 1-34n-2w, dry in Dundee, TD 650 ft.

Leelanau County, Centerville Township: K. O. Mutch 1 Isadore Gauthier, C-N SW SW 4-29n-12w, dry, TD 400 ft.

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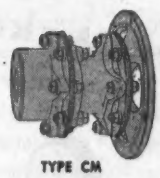
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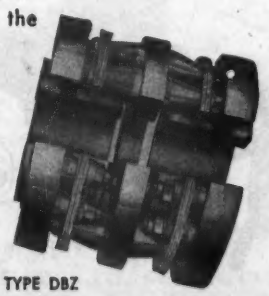
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HOUSTON, UNIBOLT TEXAS

Mecosta County, Aetna Township: Smith Petroleum Co. 1 N. M. Buchanan, SW NW NW 10-13n-10w, dry in Marshall, TD 1,423 ft.

Midland County, Edenville Township: Sun Oil Co. 1 George R. Burgess, SE NW NE 23-16n-1w, dry in Dundee after oil show, TD 4,078 ft.

Oceana County, Grant Township: Dale M. Leonard 1 John Jourtis, SE NE NW 24-13n-17w, dry in Detroit River, TD 3,474 ft.

Golden Township: Welsh Oil Co. 1 L. P. Munger, SW SW SW 8-15n-18w, dry in Traverse limestone, TD 1,656 ft.

Ottawa County, Jamestown Township: Ford Oil Co. 1 Bernie Young, NE SW SE 25-5n-13w, dry in Traverse limestone, TD 1,676 ft.

Tuscola County, Arbela Township: Ervin Major and Fred Riddell 1 F. and E. Brand, NW SW SW 20-10n-7e, dry in Dundee, TD 2,666 ft.

Van Buren County, Columbia Township: Norman L. Stevens 1 D. and George R. Burns, SE NW NE 5-1s-15w, dry in Detroit River, TD 1,361 ft.

EASTERN TEXAS

Harrison County Wildcat Reports Additional Shows

DALLAS.—Sam E. Wilson Oil Co. 1 Hearne, Harrison County wildcat 5 miles east of Leigh, reported additional shows of oil and gas from the Pettit limestone. Cores at 5,590-5,610 ft. indicated gas, while cores between 5,610-30 ft. showed slight porosity and good oil odor. Total depth was 6,115 ft. in sand and shale. Operators ran casing and were to acidize. The same company's 1-B Hearne, a north offset, was building derrick.

This test has attracted considerable interest on both sides of the Texas-Louisiana state lines. Arrow Drilling Co., Tulsa, and Sells Petroleum Co., Gladewater, Tex., were reported moving in for a test approximately 1½ miles southwest of the 1 Hearne. Location is on the 210-acre F. Allen tract in the D. M. Evans Survey. It is to be drilled to 6,300 ft. Major companies supporting the 1 Allen include Humble Oil & Refining Co., Phillips Petroleum Co., Stanolind Oil & Gas Co., and Gulf Refining Co., it was said.

In Rains County, 6½ miles southeast of Emory, Bobby Manziel 1 F. F. Grimes was drilling below 5,523 ft. in shale and limestone. The following sample tops were reported: Austin 3,640-70 ft., base 3,995-4,005 ft.; Sub-Clarksville sand 4,025-35 ft., Woodbine sand 4,510-20 ft., Red Beds 4,530-40 ft., and Georgetown limestone 5,290 ft.

Miscellaneous wildcat progress reports included: Cass County, 5½ miles southeast of Atlanta, Ark-La Oil Co. 1 Brooks, drilling below 6,540 ft. It logged the Goodland at 3,562 ft., Paluxy at 3,702 ft., and Massive anhydrite at 5,720 ft. In the same county, 2½ miles west of Bloomburg, Shell Oil Co., Inc. 1 Gerald Smith was drilling below 7,544 ft. in red beds and shale. In Henderson County, 6½ miles south of Malakoff, W. B. Hinton 1 W. D. Thornton was drilling at 5,534 ft. in lime and shale. Shell's 1 F. E. Lumpkin, 4 miles southwest of Cedarville, Kaufman County, was drilling in sandy lime at 6,908 ft. D. H. Byrd et al 1 T. W. Blount, 3½ miles west of San Augustine, drilling below 5,548 ft. in shale and lime. It logged top of the Fredericksburg at 5,000 ft., on an elevation of 411 ft. In Smith County, Magnolia Petroleum Co. 1 R. W. Fair, 2 miles north of Mount Sylvan, was drilling below 8,586 ft. in lime and shale. Sample top on the upper Glen Rose was placed around 7,910-20 ft.

Six counties received a total of 17 locations. They were: Anderson 4, Harrison 2, Henderson 1, Marion 6, Panola 2, and Wood 2. Eight oil wells and 3 gas wells made up the week's completions. By fields, they were: Cayuga 1, LaRue 1, Picton 1, Sand Flat 1, Quitman 2, Hawkins 1, Manziel 1, Carthage 2 gas, and Bethany 1 gas.

EAST TEXAS WILDCAT FAILURES

Hill County: Joe Thompson 1 C. B. Carr, Alford Sur., 1½ mi. NW Hubbard, dry, TD 1,337 ft. in shale, no shows.

Walker County: Curtis Singleton Drilling Co. 1 Gibbs Bros., James Clute Sur., dry, TD 5,005 ft., no details available.

SOUTH LOUISIANA

Beauregard Parish Gets Gas-Condensate Field

NEW ORLEANS.—A new gas-condensate field has been opened in Beauregard Parish by Vincent & Welch 1 Vincent & Welch-Houston Oil Co., 14-6s-13w, approximately 1½ miles east of production in Bancroft field. Drilled to a total depth of 8,425 ft., this well flowed on a 24-hour potential gage, 58 bbl. of 59.7°-gravity condensate with a gas-condensate ratio of 10,776, through a 7/64-in. choke. Tubing pressure was 1,700 psi. The 7-in. production string is set at 8,134 ft. Oil sands were tested from 8,083-86 ft. and on drill-stem test recovered 12 stands of 40°-gravity oil. Top of oil sand 7,898 ft. Perforations for completion were made from 7,899-7,004 ft.

A new pay zone in Whitecastle field of Iberville Parish has been opened by Shell Oil Co., Inc. 40 A. Wilbert, in 8-11s-12e. Total depth is 4,328 ft., and 5½-in. casing was set at 4,310 ft. This well flowed an initial production gage of 130 bbl. of 23.8°-gravity oil through an 8/64-in. choke with gas-oil ratio of 153. Tubing pressure was 450 psi. and casing pressure 575 psi. Production was through perforations at 3,740-3,750 ft., with no water in the flow.

Kerr-McGee Oil Industries, Inc. will attempt a production test in their 1 State, Lease 754, Block 32, in the Ship Shoal area of Terrebonne Parish in the Gulf of Mexico. Located approximately 12 miles out in the Gulf of Mexico, the well has encountered salt at 2,537 ft. and bottomed in the salt at a total depth of 2,564 ft. The 9⅝-in. liner has been set from 1,702-1,846 ft. and perforations made with 8 shots from 1,780-81 ft. On a drill-stem test using ¼-in. bottom and ⅛-in. chokes, 7 psi. pressure developed. Tool was pulled and recovered 10 stands of 22.9°-gravity oil. These perforations were squeezed and two sets of perforations from 1,510-11 ft. and 1,528-30 ft. were made for a squeeze job. Hole is being perforated from 1,734-1,750 ft. for a production try. This test was scheduled to test the 5,000-ft. level. Possible oil sands have been encountered at 1,508-25 ft., 1,535-1,585 ft.

Heavy seas are hampering operations in the Gulf of Mexico explorations. Stanolind Oil & Gas Co. 2 State, Lease 739, Tract 884, located between Timballer and Caillou Island fields, has been shut down at a depth of 9,000 ft. Operations will be resumed as soon as the weather permits.

Twelve new locations, including 3 wildcats, 1 each in Calcasieu, Plaquemines, and Vermilion parishes, were reported this week. Two successful wildcats opened one new field in Beauregard Parish and one new oil pay in Iberville Parish. Four wildcat failures were reported, 1 each in Jefferson Davis, Plaquemines, St. John, and S. Landry parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Beauregard Parish: New condensate discovery—Vincent & Welch 1 Vincent & Welch-Houston Oil Co., 14-6s-13w, 1½ mi. E of Bancroft production, TD 8,425 ft., top pay 7,899 ft., perf. 7,899-7,904 ft., IP: 58 bbl. condensate per day through 7/64-in. choke, gas-condensate ratio 10,776, TP 1,700 psi., gravity 59.7°, no water.

Iberville Parish: New oil sand White Castle field—Shell Oil Co., Inc. 40 A. Wilbert,

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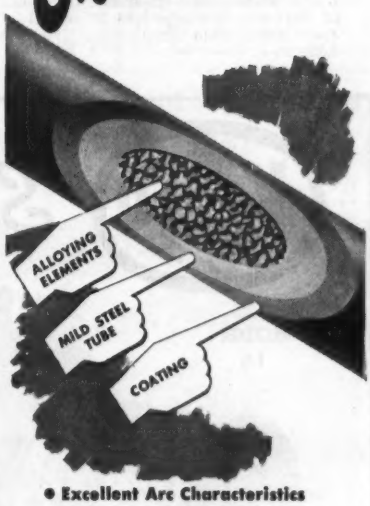

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SOUTH LOUISIANA WILDCAT FAILURES

Jefferson Davis Parish: Stanolind Oil & Gas Co. 1 H. C. Bucklin, South Elton area, 4-8s-3w, 1½ mi. south of production, dry, TD 9,951.

Plaquemines Parish: S. W. Richardson 1-D Selma Moss, 31-14s-13e, east of Stella field and NW of Delacroix field, dry, TD 11,407 ft.

St. John Parish: The California Co. 1 Louisiana State Lease 1303 in NE portion of Lake Des Allemands, 13s-19e, 6 mi. NW of Paradis field, dry, TD 11,500 ft.

St. Landry Parish: The Union Sulphur Co., Inc. 1 Fitzmaurice, 13-4s-5e, just south of Palmetto townsite and 11 mi. N of Port Barre field production, dry, TD 9,020 ft.

N. CENTRAL TEXAS

Coats & Foster Open New Ellenburger Field

WICHITA FALLS.—Coats & Foster Drilling Co. 1 C. A. Scott opened a new Ellenburger field in northeastern Comanche County, swabbing at the rate of 50 bbl. of oil a day. The discovery, in the William McClellan Survey, Abstract 642 (corrected) is about 2 miles east of the town of Comyn. Swabbing was from perforations between 3,526-28 ft. and th oil tested 45°. Saturated Ellenburger was logged between 3,528-40 ft., and drilling continued to 4,300 ft. before casing was set at 3,690 ft. The lower section did not appear favorable for production. The test was first washed with 250 gal. of acid, after which it swabbed some 15 bbl. of oil a day. A second treatment of 500 gal. resulted in the increase to 50 bbl. daily. The well was said to have headed at intervals while being swabbed. There was no water reported with the oil.

In Grayson County, Standard Oil Co. of Texas 1 Mary H. Rifenburg, 1 mile northeast of Sherman and ½ mile north of its 1 Rising (Strawn sand discovery), logged oil sand from 2,920-22 ft., then cored between 2,922-30 ft. to recover 1½ ft. of gray, tight sand; 3 ft. of sand having a good stain of oil; then 2 ft. of shale. Cores from 2,948-58 ft. recovered 6 ft. of saturated sand, and 3 ft. of gray sand with no shows. A drill-stem test was to be made.

In northern Montague County, flowing production was reported from Bay Petroleum Co. 1 Watson heirs, 2 miles south of the town of Belcherville. While no gage or estimate was made, the well flowed into pits to clean itself when plug was drilled on casing set at 5,668 ft. It topped the Caddo at 5,610 ft., and logged saturated conglomerate from 5,677-83 ft., from which it is believed to be flowing. Location is about 2 miles northwest of Sanders field.

In Cottle County, 4 miles south of Paducah, Stanolind Oil & Gas Co. 1 Richards, Block 1, I&GN Survey, was attempting a second drill-stem test at 7,886 ft., in hard sand, identified as the Hickory of the Cambrian. A previous drill-stem attempt was given up, due to mechanical failure, at 7,877 ft.

Wildcat progress reports were: Texon Oil & Land Co. 1 G. R. Davis, 11 miles west of Throckmorton, BBB&C Survey, preparing to run drill-stem test of the Caddo limestone topped at 4,861 ft. Cores showed oil from 4,861-92 ft., total depth. Northeast of the Humble-Stubblefield pool of southeast Throckmorton County, Fred M. Manning, Inc. 1 Stubblefield-Letwin, Block 991, TE&L Survey, was drilling ahead below 4,112 ft. The same company's 1 Manning-Graham, Block 994, TE&L Survey, 2 miles south of the Magnolia-Graham area, was drilling below 4,410 ft. in shale. Manning 7 McKnight, southeast outpost to production in the McKnight field, was below 3,000 ft.

In Montague County, 1 mile southwest of Montague, Sinclair-Prairie Oil Co. 1 Gronow was drilling below 5,688 ft. in shale, after drilling a dry limestone section between 5,637-71 ft. The Texas Co. 1 D. B. Benson, 6,000-ft. wildcat test 4 miles northwest of Bowie, was drilling ahead below 3,500 ft. Perry Browning 1 Minnie Decker, 6,000-ft. rotary wildcat 2 miles west of Huff in Archer County, was drilling ahead below 3,200 ft.

New locations for the week in North Texas and West Central Texas totaled 44 each. By counties these were: Archer 13, Clay 5, Cooke 4, Jack 3, King 1, Montague 3, Wichita 10, and Wilbarger 5. For West Central: Callahan 1, Coleman 4, Eastland 2, Fisher 1, Haskell 4, Jones 9, Shackelford 7, Stephens 6, Brown 1, Taylor 4, Nolan 1, and Throckmorton 4.

North Texas field well completions totaled 23 oil and 3 gas. They were, by counties: Archer 5, Cooke 2, Montague 1, Wichita 9, Young 5 oil and 1 gas; Throckmorton 1 and Palo Pinto 2 gas wells.

NORTH CENTRAL TEXAS WILDCAT FAILURES

Archer County: Dub-Wood Drilling Co. 3 S. L. Scott, BS&F Sur., 10 mi. NW Olney, dry, TD 1,300 ft. in shale, Gunsight lime 1,180 ft.

J. C. Fastnow et al 1 D. S. Dudley, Sec. 3, Blk. 3, H&TC Sur., 3 mi. SW Mankins, dry, TD 1,825 ft., Gunsight 1,724 ft.

Henry Grace Production Co. 1 Wilson Estate, Lot 7, Blk. 21, ATNCL Sur., 10 mi. N Archer City, dry, TD 1,623 ft. in sand.

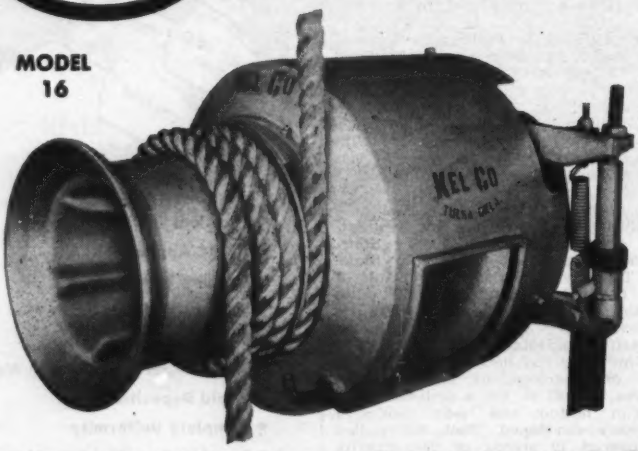
Cooke County: Utex Oil Co. 1 Paul & Frances Yarbrough, R. Wheelock Sur., A-1,121, 3 mi. N Era, dry, TD 1,342 ft., Ellenburger 1,273 ft.

WEST CENTRAL TEXAS WILDCAT FAILURES

Brown County: G. C. English 1-A F. H. Madison, Juan Delgado Sur., 4 mi. E

KELCO Safety

MODEL 16



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Callahan County: J. F. Fason 1 J. A. Barr, A. Cherry Sur. 332, ¾ mi. NW Cross Plains, dry, TD 401 ft.

D. A. Johnston 1 A. B. Hutchinson, Sec. 303, Blk. 5, SPRR Sur., 1 mi. SW Putnam, dry, TD 700 ft.

Haskell County: T. D. Humphrey 1 M. V. Smith, I. Ramos Sur., 2½ mi. E Haskell, dry, TD 2,936 ft.

Jones County: S. B. Roberts et al 1 A. E. Pardue, J. B. H. Bayne Sur., 3½ mi. NE Stamford, dry, TD 3,475 ft.

H. Brauer et al 1 C. W. Cecil, B. Travene Sur. 190, 5 mi. E Hawley, dry, TD 2,220 ft., coal 1,921-23 ft., sand with water 2,217-20 ft.

McCullough County: Mid-Texas Oil Co. 1 W. H. Jones, 1½ mi. SE Winchell, dry, TD 1,045 ft., Fry sand, with slight show oil 585 ft.

SOUTHWEST TEXAS

East Premont Field Gets Two New Pays

CORPUS CHRISTI.—Two new oil pays for the East Premont field of Jim Wells have been established by Magnolia Petroleum Co. 107 A. A. Seeligson, second well in the new field. The test is now cleaning out for completion as a dual-oil well in these zones. Perforations at 4,773-83 ft., flowed 16.2 bbl. of oil in 9 hours through a 9/64-in. choke, with 125 psi. working pressure, and gas-oil ratio of 417. Through perforations at 4,688-95 ft., the well flowed 86.48 bbl. of oil in 23 hours through 9/64-in. choke, 525 psi. working pressure, gas-oil ratio 393, and tubing was run for the completion. This well is 1,320 ft. west of the 103 Seeligson discovery well, which was completed September 1 through perforations at 5,857-62 ft. in zone 22, 1½ miles southeast of the old "Premont" field, and 1½ miles northwest of "South Haldeman" field.

A new oil pay for Luby field, Nueces County, has been opened by Sun Oil Co. 1 McCann, located in Share 9-G, Partition of Collins Petronilla Ranch. This was a deepening job, old total depth 5,065 ft. Operators drilled to a new depth of 6,445 ft., and completed through perforations at 6,131-35 ft., for an initial production of 16 bbl. oil per day through a ½-in. choke, 520 psi. tubing pressure, casing sealed, and gas-oil ratio of 8,696. Salt water was tested in the regular 6,400-ft. pay zone.

George W. Graham 2 Kaffie Lumber & Building Co., extension well north of the La Gloria field, Jim Wells County, and ½ mile northwest of the townsite area oil production, has gaged 158.74 bbl. of 41°-gravity pipe-line oil per day through a 5/32-in. choke, with 1,250 psi. tubing pressure, 1,650 psi. casing pressure, gas-oil ratio 473. Production is through perforations at 6,114-20 ft., in the "Upper Scott zone." This well is in Lot 29, Section 8, R. P. Haldeman Subdivision of Seeligson Ranch. Top of pay zone at 6,096 ft. Total depth 6,250 ft., and 5½-in. casing is set to 6,213 ft.

Lonnie Glasscock 1 Sam Countiss et al, in the extension area of Agua Dulce field, Nueces County, has been completed for an initial production of 121 bbl. of oil per day through 9/64-in. choke, gas-oil ratio 110, tubing pressure 575 psi., gravity 31.7°. This well is in the V. L. de Herrera Grant, 6 miles northeast of Banquete and 1¼ miles north-northeast of north production at Agua Dulce field. Top of pay 5,095 ft., total depth 5,136 ft. Production is through perforations at 5,095-99 ft. Operators have filed application for discovery oil allowable rights to apply to this well.

Magnolia Petroleum Co. 1 H. L. Smith, wildcat 6 miles northeast of Pearsall and 8 miles northeast of Pearsall field, in Frio County, swabbed approximately 1 bbl. of fluid every 2 hours through open hole at 3,709-15 ft. in the top of the Navarro sand. About 90 per cent of the fluid was water, and 10 per cent oil. Operators are moving in a standard rig to deepen. Location is in the southwest corner of O. C. Smith Survey, Abstract 1,032.

Humble Oil & Refining Co. 1-P Flour Bluff-State, ½ mile northeast of production at Flour Bluff field, Nueces County, is flowing pipe-line oil into tanks through a ½-in. choke, through perforations at 6,634-46 ft. Total depth is 6,807 ft., with 5½-in. casing at 6,805 ft. Location is in State Tract 8, in Laguna Madre.

The 30 new locations reported this week included 19 wildcat starts, 2 each in Guadalupe and San Patricio, 3 each in Brooks, Duval and Starr counties, and 1 each in Caldwell, Frio, Jim Hogg, Nueces, Webb and Williamson counties. Successful wildcats opened 1 new oil sand in Luby field, Nueces County, extended Charlotte pool, in Atascosa County, and extended Agua Dulce field in Nueces County. Eleven wildcats were dry, 2 each in Caldwell and Guadalupe, and 1 each in Bexar, Medina, Milam, Starr, Webb, Williamson and Zapata counties.

SOUTHWEST TEXAS SUCCESSFUL WILDCATS

Atascosa County: Extension to Charlotte pool—Lewis Oil Co. Marrs McLean, in Peter Bluntzer Sur. 6, 1 mi. E of Frio County line, top pay 5,177 ft., TD 5,267 ft. (open hole 5,180-5,267 ft.) IP: 77 bbl. oil per day through a ½-in. choke, gas-oil ratio 250, TP 400 psi., CP 740 psi., grav. 38°, no water.

Nueces County: Extension Agua Dulce field—Lonnie Glasscock 1 Sam Countiss et al, V. L. de Herrrera Grant, 6 mi. NE of Banquete, 1¼ mi. N-NE of north ext. prodn. at Agua Dulce, top pay 5,095 ft., TD 5,136 ft., perf. 5,095-99 ft., IP: 121 bbl. oil per day through 9/64-in. choke, gas-oil ratio 110, TP 575 psi., casing sealed, grav. 31.7°, no water.

New oil sand, Luby field—Sun Oil Co. 1 G. H. McCann, Canutillo Colony Ditch

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Co. Sur., old well deepened, original TD 5,065 ft., new TD 6,445 ft., perf. 6,131-35 ft., IP: 16 bbl. oil per day through a ½-in. choke, gas-oil ratio 8,696, TP 520 psi., casing sealed, gravity 32°, no water.

SOUTHWEST TEXAS WILDCAT FAILURES

Bexar County: Hair & Hair 1 F. M. Dickes, in J. M. Urregas Sur. 32, 1 mi. S of San Antonio, dry, TD 608 ft.

Caldwell County: Chas. W. Crader 1 Bennie W. Bock, in A. M. Leavy Lge., 20 mi. N of Lockhart, dry, TD 1,040 ft.

Novak & Hillard 1 Ben Forester et al, in Pablo Martinez Grant, 2 mi. W of Lytton Springs, dry, TD 2,123 ft.

Guadalupe County: Butler Oil Co. 1 Mary Shlichting, in A. M. Esnaurizar Sur. 11, 2 mi. NE of Clear Springs, dry, TD 840 ft.

M. H. Dees 1 J. F. Webb, in A. Gerren Hinds Sur., 1½ mi. SW of Luling, dry, TD 2,985 ft.

Medina County: John F. Camp & Sons 1 Mary Blatz, M. Nester Sur., 4 mi. SE of Devine, dry, TD 2,206 ft.

Milam County: T. Y. McCormick 1 J. S. Jacobs, in Jose Leal Grant, 2 mi. E of Minerva, dry, TD 1,462 ft.

Starr County: Ralph E. Fair 1 Juan Dios Vela, in Porc. 92, Share 2-A, 2 mi. S of Boyle field, dry, TD 4,532 ft.

Webb County: George Buck & J. N. Abel 3-C J. G. Garcia, Block 8, Sur. 592, Los Ojuelos Grant, 2 mi. E of Mirando City, dry, TD 1,935 ft.

Williamson County: H. F. Goff 1 Mrs. E. Matezchik, T. V. S. Stroude Sur., 1½ mi. SW of Coupland, dry, TD 948 ft.

Zapata County: Rodney Delange 1-A Cuellar Hrs., Sur. 245, 12 mi. NW of Randado, dry, TD 1,105 ft.

ROCKY MOUNTAIN

New Pool Expected Near Elk Basin Field

DENVER.—A new pool on the west side of Elk Basin field appears imminent in Seaboard Oil Co.-Resolute Oil Co. 53-33 Northern Pacific, NW SW NE 33-58n-100w, Park County, Wyoming, on the Sand Coulee structure. It topped the Phosphoria (Embar) of Permian age at 8,496 ft., and in a drill-stem test at 8,495-8,525 ft., open 1 hour, recovered 800 ft. of light, high-gravity oil with estimated 1,000,000 cu. ft. of gas. The tentative top of the objective Tensleep was at 8,516 ft. Following the test coring was resumed to explore the Tensleep, and at last report was at 8,535 ft. The location is separated from the Elk Basin field proper by faulting, and is 3 miles west of the nearest producer in the Tensleep and 4 miles west of Stanolind 95-M, the Madison discovery in Elk Basin. The well previously had shown favorable indications in upper horizons. In a drill-stem test in the second Frontier at 5,918-48 ft. it recovered 2½ bbl. of oil per hour with 200,000 cu. ft. of gas. Another test at 5,918-90 ft., open 2 hours, it recovered 4 bbl. of 43.4 gravity oil with estimated 75,000 cu. ft. of gas.

Torchlight discovery.—Clark Drilling Co. 1 Unit, SW SE NE 24-51n-93w, a Tensleep test in the old shallow Torchlight field on Stanolind Oil & Gas Co.-Charles E. Orchard acreage, flowed 1,632 bbl. of 35.2°-gravity oil in 24 hours, cutting 8 per cent basic sediment and water. Three 500-bbl. tanks are being erected preliminary to an official gaging.

Powder River Basin test.—Texas Co. 1 Unit, C NW NE 2-52n-72w, Adon structure, Campbell County, Wyoming, which had 2,000 ft. of oil and 3,100 ft. of water in the Converse sand, Minnelusa formation, in a drill-stem test at 9,006-17 ft., is drilling ahead at 9,182 ft. The big lease play which was under way along the eastern edge of the Powder River basin due to the Mush Creek operation in Weston County immediately spread out into the basin when the Adon strike was made. The district land office at Buffalo reports 298,000 acres of federal land filed upon in Campbell County in 1 week after the strike was reported, bringing the total to more than 600,000 acres. This is exclusive of filings in Weston County and to the north and south of Mush Creek, and of leasing of state and fee lands.

Sand Creek extension.—General Petroleum Corp. 25-26 Government, C NW SW 26-46n-91w, Sand Creek, Washakie County, Wyoming, had the top of the Frontier formation at 6,739 ft., and in a drill-stem test in the third Frontier sand at 6,707-39 ft. recovered gas in 4 minutes and oil in 26 minutes, and flowed during the next 6 minutes when the tool was closed. No gage was taken. This is the second well on the structure, located one-third of a mile west of the discovery.

Southern Ute gas well.—Stanolind Oil & Gas Co. 3 Ute, NW SE NE 35-32n-14w, Southern Ute structure, San Juan County, New Mexico, is reported making estimated 9,000,000 cu. ft. of gas per day at 2,602 ft. while fishing. This is the first well drilled on the structure in 25 years, three gassers having been completed in the Dakota in 1921 and 1922. Its location is ½ mile northwest of 2 Ute which made 37,000,000 cu. ft. per day at 2,360 ft.

Show in Montana wildcat.—Texas Co. 1 Manion, SE SW SE 5-11n-3e, Ragged Point, Musselshell County, Montana, is bottomed at 5,234½ ft. and preparing to make a drill-stem test.

New operations.—Thirty-five new operations were reported, 12 in Rangely field, 16 in Wyoming, 5 in Montana, and 2 in Northwest New Mexico. Wyoming locations included 4 in Mush Creek, 3 in Steamboat Butte, 2 in South Casper Creek, one each in Oil Springs, Kirby Creek, Wagonhound, Shoshone, Big Sand Draw, and 2 wildcats. One of the latter is Sinclair-Wyoming Oil Co. 77-A Unit, SE NE NE 10-26n-90w, Lost Soldier field, Sweetwater County, an old producer in the Tensleep which is being deepened from 4,049 ft. to test the Madison. The other is Stanolind Oil & Gas Co.-Ohio Oil Co. No. 1, SE SW NW 25-46n-100w, on Enos Creek, Hot Springs County, which will test the Madison at 7,000 ft. as soon as unitization is completed. Montana had one location each in Mosser, Kevin-Sunburst, Aloe area, and Cedar Creek, and one wildcat. Later is Luhman 3 Dunbar, SE SE SE 7-2n-1e, Willow Creek area, the third test by same interests near the borders of Broadwater and Jefferson counties. The New Mexico locations were 1 each in the Blanco and Kutz Canon districts.

Completions.—Twenty-one wells were completed, of which 13 were oil wells for 2,118 bbl., 3 were gas wells, and 5 were dry holes. Colorado had 9 completions, of which 6 were oil wells for 1,060 bbl., and 3 were dry holes. Five of the 6 wells were in Rangely and the other was Continental's second well at Elk Springs in Moffat County for 297 bbl. Wyoming had 4 oil wells for 836 bbl., one each in Oregon Basin, Gebo, Quealy, and Lander-Hudson.

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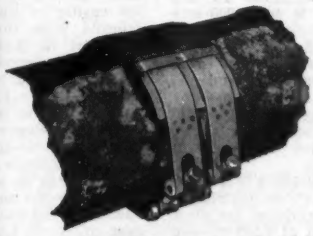

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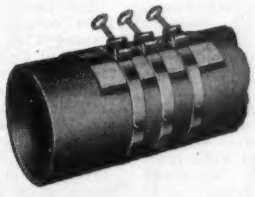

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Montana completions included 3 oil wells for 222 bbl., 2 gas wells, and 2 dry holes. The oil wells were 1 each in Cat Creek, Mosser, and Cut Bank, and the gas wells 1 each in Cut Bank and Bowdoin. Cedar Creek had a dry hole, and the other was a wildcat. One gas well was completed in Kutz Canon, San Juan County, New Mexico.

COLORADO WILDCAT FAILURES

Craig, Moffat County: Republic Oil Co. 1 Eberle, CEL SE SW 9-6n-91w, TD 4,515 ft., water in 3 sands in Mancos, temp. abd.

Newton, Archuleta County: Florance Drilling Co. 1 Federal, NW NE NE 6-66n-2w, TD 2,300 ft., P. & A. tight hole.

MONTANA WILDCAT FAILURE

Willow Creek, Jefferson County: Luhman 2 Dunbar, SE NE NE 11-2n-1w, TD 534 ft. in granite, P. & A.

OKLAHOMA

Gas Distillate Production Opened in "Big Trough"

SHELL OIL CO. 1 Joe Walters, C NE SW 14-10n-21w, 4 miles south of Elk City, Beckham County, has opened gas-distillate production in the "big trough" of Anadarko basin. On test through 3/16-in. tubing choke, the wildcat made an estimated 30,000 M.c.f. of gas daily and 15 bbl. of 61-gravity distillate per hour. Production is from Pennsylvanian with 400 perforations in casing at 9,220-30 ft. Total depth is 13,133 ft. and hole was plugged back to 12,195 ft. and then to 10,171 ft. Location is on 21,000-acre block.

Keener Oil & Gas Co. 3 Jackson-A, SE NE NE 29-7n-7e, wildcat in southeast Little River area, Seminole County, has opened new pay zone in area. Test made 200 bbl. of oil and 3,000 M.c.f. of gas per day from Calvin sand at total depth of 1,785 ft. Other producers in this area are bottomed in Senora sand.

Powell Briscoe 1 Wyskup, NE NE NW 26-13n-1e, wildcat in Jones district, Oklahoma County, looks like a new producer for area. Test topped Cleveland sand at 4,599 ft. and found 11 ft. of saturated sand. Casing was set at 4,595 ft., and total depth is 4,620 ft.

R. W. Brown 1 Hibbard, SE SW SW 21-6n-4e, outpost well east of Asher field, Pottawatomie County, had shows in Wanette sand and Viola lime. Electric log of Wanette at 3,082-93 ft. was favorable, but drill-stem test showed no results. Viola was drilled from 3,608-14 ft. with good staining and odor and 7-in. casing set at 3,610 ft.

Petty Oil 1 Steil, SW SE SE 10-16n-18e, wildcat 5 miles south of Wagoner, Wagoner County, has been brought in as a gas well from Tyner sand at 750-786 ft. Test made 5,000 M.c.f. of gas daily from Tyner.

Cotton County dominated new locations for the week with 14 out of the state's 63. Other leaders were Stephens, Carter, and Garvin with 8, 6, and 6 respectively. Cotton, Texas, Carter, Creek, and Seminole led the state in completions with 8, 7, 6, 5, and 5 respectively. State's total was 55.

OKLAHOMA SUCCESSFUL WILDCAT

Pontotoc County: Mullins 1 Adair, NE NE NW 14-4n-7e, pumped 3 bbl. of oil from Calvin at 733-60 ft., TD 2,765 ft. New pay in East Ada district.

OKLAMOMA WILDCAT FAILURES

Comanche County: Howell 1 Ka-hina-watch-it, SW SW NE 12-3s-12w, dry, TD 1,816 ft., sand 1,515 ft. and 1,650 ft., no shows.

Neeld 1 Kinder, SW NW NE 15-3s-12w, dry, TD 1,970 ft., sands 1,272-88 ft., 1,316-25 ft. and 1,344-63 ft., sandy conglomerate 1,384-96 ft., sand 1,809-23 ft., lime 1,888-98 ft. and 1,920-40 ft.

Hughes County: Barnsdall 1 Price, NW NE SE 9-7n-10e, dry, TD 3,654 ft., second Cromwell 3,640 ft.

Jackson County: Scarborough 1 Cole, NE NW SE 33-2n-20w, dry, TD 1,297 ft., no tops reported.

Lincoln County: Foundation 1 Mason, SW NW NW 18-15n-3e, dry, TD 5,317 ft., first Wilcox 5,200 ft., second Wilcox 5,278 ft.

CANADIAN FIELDS

New Area Opened In Southern Alberta

CHATHAM. — In the southern Alberta plains area, California Standard-Imperial Bantry 1, LSD 11, 2-18-13w4, has made an important crude oil discovery. The well, drilled between Brooks and Tilley and located abouut 150 miles southeast of Calgary, indicated a commercial flow of clean 24°-gravity crude on a test at 3,249-59 ft. When the tester was open, gas reached the surface in one minute, increasing from 85,000 to 1,000,000 cu. ft. Oil started to flow in 59 minutes, the rate not being reported. No water was indicated. A drill-stem test of the underlying chert showed a tight formation, eliminating danger of water intrusion from below. The well has resumed coring and will be carried to the top of the Madison and possibly to the Devonian lime, which was the original objective.

Leduc.—Globe-Leduc West 2, LSD 9, 34-50-26w4, finished at 5,284 ft. has been placed on restricted production, making 96 bbl. through 5/32 choke. This is the first independent well definitely a producer, though several others are in various stages of completion. Atlantic Oils 1, LSD 13, 23-50-26w4, after getting good shows of oil and gas, set casing in the third porous zone. After trouble with the tester, leading to abandonment of drill-stem tests, a good core was taken, production pipe run, and the well is drilling in and testing.

Home-Leduc 1, LSD 11, 21-50-26w4, nearly a half mile west of the Imperial group of D-2 producers, has production in that zone and is deepening to test the D-3 zone. The latter zone has shown production in earlier wells in a semi-circular strip 4 miles long, with the southern tip 1½ miles southeast and the northern tip 2½ miles northeast of Home-Leduc 1. Nine Imperial D-2 producers, which were not carried to the D-3 horizon, lie between this well and the proven strip.

East Leduc-South Brazeau 1, LSD 8, 9-50-26w4 coring in the second porous zone around 5,188 ft., showed a rise of oil-cut mud and looks like a producer. East Leduc 2, LSD 10, 5-51-25w4, east of the proven field, is below 3,500 ft. Globe-Leduc West 3, LSD 10, 34-50-26w4, is coring second porous zone below 4,919 ft. No. 4, LSD 15, 34-50-26w4, is below 700 ft. and No. 5, LSD 3, 19-50-26w4, has location.

Imperial 15, LSD 7, 21-50-26w4 at 5,110 ft., Imperial 16, LSD 13, 15-50-26w4 at 5,125 ft. and Imperial 18, LSD 13, 22-50-26w4 at 5,050 ft., are testing with various chokes, all being definitely producers. Imperial 19, LSD 16, 21-50-26w4, is drilling out plug after cementing at 5,060 ft. Imperial 17, LSD 16, 16-50-26w4, is in lime below 5,000 ft. Imperial 20, LSD 8, 34-50-26w4, is below 4,332 ft., and two new tests, No. 21, LDS 11, 26-50-26w4 and No. 22, LSD 2, 26-50-26w4 are drilling.

Turner Valley.—In the Turner Valley north extension, Home-Millarville 26, LSD 15, 18-21-3w5, has been completed with 288 bbl. initial production from the Madison at 8,541-8,971 ft. Home-Millarville 29, LSD 2, 33-20-3w5, has finished with Madison at 7,670-8,374 ft. and is testing. Five other wells are drilling, with one location.

Del Bonita.—In the Del Bonita field, close to the Montana boundary, National-Del Bonita 1, LSD 9, 13-1-22w4 on the west flank of the structure got Madison limestone at 5,087 ft. and has run casing to finish with standard tools. A second test will be drilled on the northern trend of the structure..

Pipestone Creek.—South and east of the Leduc field, McColl-Ashley 2-16, LSD 2, 16-47-25w4 has encountered gas at 3,924 ft. and is deepening to test the Devonian limestone with contact expected around 4,600 ft.

Westlock.—In the Westlock area, north of the Leduc field, Westlock-Langville 1, LSD 13, 14-59-26w4 is believed in the third porous zone of the Devonian. Some drilling mud was lost at 3,950 ft. and plug was set. Coring frequently for about 1,000 ft., the test has met oil and gas at intervals.

Lloydminster.—In the Alberta section of the Lloydminster field, Bee Jay 1, LSD 3, 15-20-2w4 with sand at 2,022-25 ft. is on pump, with production unreported. Castle 3, LSD 4, 11-50-2w4 at 1,992-2,009 ft. is pumping 30 bbl. Command-Yorkton 2, NE 2, 16-50-1w4 with sand at 1,928-39 ft. is pumping 25 bbl. L.O.P. Syndicate 1, LSD 14, 11-50-2w4 at 1,992 ft. has 70 bbl. L.O.P. Syndicate 2, same LSD, at 1,993-97 ft. has 60 bbl. Superior 9, LSD 10, 14-50-2w5, bottoming at 1,967 ft. is unofficially reported pumping 103 bbl. Superior 10, LSD 10, 14-50-2w4 is testing at 1,962 ft.

OHIO, KENTUCKY

Extensions Open Big Play In Perry County Fields

COLUMBUS. — Extensions to both the Clayton and Sego oil pools in Madison Township, Perry County, were completed during the week. B. G. Bartley et al 2 R. E. Beard, Sec. 32, a ¼-mile north extension to the Clayton pool, filled up 1,500 ft. in 12 hours from the Clinton at 3,219-61 ft. After a 100-qt. shot, the well made 165 bbl. in 24 hours. Preston Oil 2 Owen Ford, Sec. 33, with Clinton sand at 3,144-85 ft. made 40 bbl. the first day after shot. A record number of 13 wells are now drilling in the township.

The first offset to the Republic Steel Fee well in Carlisle Township, Lorain County, came in at 3,280,000 cu. ft. natural, and was located on the Duplex Mfg. Co. in Sec. 3. Clinton sand at 2,296-2,300 ft. gaged 800,000 cu. ft., and a second sand at 2,303-16 ft. gaged 2,480,000 cu. ft.

While drilling in northern Jackson Township, Knox County, the Preston Oil encountered a gas sand near the bottom of the Niagara lime. The top was logged at 2,503 ft. and was drilled to 2,512 ft. where the well gaged 760,000 cu. ft.

E. A. Fierbaugh's wildcat on M. Clouse, Lot 24, Ruggles Township, Ashland County, was drilled through the St. Peter sand with only a small show of oil and was plugged back to 2,466 ft. to shoot the Clinton sand. When tubed and shut in the well gaged 260,000 cu. ft. Clinton sand was found at 2,455-58 ft., Trenton lime at 3,815-4,433 ft., Green sand at 4,433-54 ft. and the St. Peter at 4,454-4,503 ft.

Muskingum County reported 4 locations, and Licking and Perry counties 2 each out of a total of 17. Twenty-two wells were completed with Brush Creek and Cambridge fields in the lead with five each.

OHIO SUCCESSFUL WILDCATS

Medina County, Litchfield Township: Edson & Son 1 E. H. Miller, Lot 31, Clinton 2,911-18 ft., 145,000 cu. ft. of gas, TD 2,936 ft.

EASTERN KENTUCKY

ASHLAND.—The M. B. Goble property, Martin County, came in for a sizable completion during the week by Kentucky-West Virginia Gas Co. No. 5772 with 643,000 cu. ft. of gas in Salt sand at total depth of 633 ft.

The same company also completed No. 585, George H. Ray, Pike County, for 94,000 cu. ft. of gas in shale, A.S.; total depth was 3,506 ft.

WESTERN KENTUCKY

OWENSBORO.—Webster County continues the "hot spot" of Kentucky with three wildcats currently drilling or contemplated.

Nash Redwine 1 E. T. Melton, 24-M-22, 2½ miles southwest of Dixon, is drilling below surface pipe. George S. Engle 1 Ollie Nail, 16-M-21, 5 miles north of Clay, is rigging up. Joe Reznik 1 Sallie Brown, 10-L-23, 2½ miles west of Slaughter pool, is tentative location for wildcat.

Activity continues in Slaughters pool which was opened August 16, 1947. To November 1, the pool produced 95,000 bbl. of oil and is now making 1,750 bbl. daily.

INDIANA

EVANSVILLE.—George & Wrather Drilling Co. 1 L. J. Keiffer, NW NW SW 25-1s-12w, 1 mile south outpost to East Mount Carmel pool, had favorable drill-stem test of Cypress sand at 1,950-66 ft. and shot sand with 40 qt. with 800 ft. of oil in hole.

Blowout and fire destroyed rig at Illinois Mid-Continent 6 Edith Burkett, SE NW NW 24-1s-12w, East Mount Carmel pool, Gibson County, when high pressure gas sand was unexpectedly encountered at 1,750 ft.

LA.-ARK.

Ward et al to Run Casing On Shallow Wildcat

EL DORADO.—H. B. Ward et al 1 G. A. Patterson, 30-18s-14w, had total depth at 2,467 ft. and was preparing to run casing. This shallow wildcat test had some promises of gas in sand at 2,098-2,113 ft., but results of later sidewall cores were not revealed. Top on the Nacatoch sand was 2,023 ft.

Reports from other exploratory wells included Chicago Corp. 1 T. H. Chaffin, 29-18s-20w, Columbia County, which was drilling below 7,635 ft. Tentative tops placed the Travis Peak at 5,051 ft., and the Cotton Valley at 6,420 ft., by samples. In Lafayette County, J. K. Wadley et al 1 H. D. Haberyan, 7-16s-24w, was drilling below 3,408 ft. in shale. Top on the Tokio was 3,002 ft. In Bradley County, Marine Oil Co. 1 Crawford, 17-12s-9w, was drilling in Meekin sand at 3,600 ft. Sample tops placed gas rock at 3,095 ft., and Nacatoch at 3,155 ft.

In Louisiana, M. A. Halsey 1 Herald, 1-16n-11w, Bossier Parish, had total depth at 2,581 ft. in Tuscaloosa. Cores at 2,565-69 ft. showed sandy shale, and coarse sand with gas odor and show of oil at the base. An additional 2½ ft. between 2,569-81 ft. had the same showing, with the balance being ashy shale. A drill-stem test between 2,565-81 ft., open 30 minutes, recovered 1,260 ft. of salt water. Operators ran electric log and were waiting on cement. In 29-15n-10w, Union Producing Co. 1 Burkett was drilling below 3,696 ft., with no shows.

In Catahoula Parish, Hunt Oil Co.'s two exploratory tests had little change from the previous week. The 1 Louisiana Delta Lumber Co., 6-4n-5e, was preparing to core at 9,819 ft., and the 139-F Nebo Oil Co., 19-10n-5e, was drilling below 5,817 ft.

In Desoto Parish, F. A. Callery 1 Ellerbe, 18-15n-12w, cored tight limestone showing a slight oil stain and odor, between 4,665-75 ft. A drill-stem test at 4,722-48 ft., open 20 minutes, recovered 10 ft. of mud, with no shows. Operators were running electric survey.

In East Carroll Parish, Union Producing Co. 1-A O'Brien, 5-19n-11e, was below 5,573 ft. R. L. Fisher 1-A Tensas Delta, 5-11n-6e, was drilling at 7,020 ft. It cored sand and shale at 6,853-58 ft., and silty sand at 6,870-75 ft. The California Co. 2 Breece Lumber Co., 30-17n-5e, Ouachita Parish, was drilling below 8,018 ft. In Webster Parish, Hunt Oil Co. 1 Haynesville Mercantile, 9-23n-9w, was drilling below 11,958 ft. in Smackover.

Exploration work in both Arkansas and North Louisiana is holding steady. First reports for Arkansas included a 7,400-ft. test 3 miles east of the Buckner field, in Columbia County; and a 4,500-ft. Travis Peak test in Union County, 3½ miles southeast of the Hillsboro field. In Bienville Parish, location was made for an 8,000-ft. Travis Peak venture in 19-17n-5w, 2 miles northeast of the Bear Creek field; a 10,000-ft. Cotton Valley test in 22-18n-4w, Lincoln Parish, northwest of the Simsboro field; a 9,500-ft. well in 30-12n-6w, Natchitoches Parish, 12 miles southwest of the Calvin field, and a 3,500-ft. test for Ouachita Parish, 18-14s-18w, 7 miles north of the active Wesson area.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Union Parish: Pan American Production Co. 1 Elva Rugg, NE SE 31-20n-1w, flowed 1,940,000 cu. ft. of gas and 93 bbl. of 59°-gravity distillate per day through 18/64-in. choke, perforations in Bodcaw at 8,388-8,404 ft., flowing tubing pressure 3,090 psi., TD 8,809 ft., discovery of D'Arbonne field.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: E. L. Johnson 1 Moresi, 15-22n-14w, dry, TD 3,154 ft., no shows.

Concordia Parish: The Texas Co. 1 M. W. Walker, NW NE 20-8n-8e, dry, TD 9,500 ft., Tuscaloosa 8,714 ft., Marine Tuscaloosa 9,005 ft., Massive sand 9,360 ft., Lower Cretaceous 9,452 ft.

KANSAS

Herndon Gets New Pay For Eveleigh Pool

HERNDON DRILLING CO. 1 McCauley A, SW SW 6-18-13w, Barton County, has been completed for 391 bbl. daily from Lansing-Kansas City lime, new producing horizon for Eveleigh pool. Arbuckle lime, producing pay for other wells in pool, was found dry to 3,400 ft. Well was plugged back to 3,340 ft. and casing perforated from 3,177-81 ft. and 3,188-92 ft. for pump test.

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SW 7-28-1w, has been completed with a 3,000-bbl. maximum bomb potential as the fifth producer in the new Schulte pool, 7 miles southwest of Wichita. Well had Simpson at 3,663 and total depth is 3,669 ft.

Bridgeport Oil Co. 1 Hauschild, SE SE SE 17-15-19, wildcat 2 miles east of Penny-Wann pool, Ellis County, recovered 10 ft. of free oil and 65 ft. of salty oil-cut mud in 1-hour drill-stem test of 3,583-92 ft. in Reagan sand.

Skelly Oil Co. 2 Boggs "A," SW SE SE 8-33-12, ¼ mile north of Boggs pool and 1 mile south of Northeast Medicine Lodge gas pool, Barber County, made 10,647 M.c.f. of gas on test of Simpson sand.

Barton, Rooks, Butler, and Stanton counties led the state in new locations for week with 8, 8, 7, and 6 respectively. In completions, Cowley, Butler, Rooks, Stevens, Barton, and Ellis were high with 7, 6, 6, 5, 5, and 5.

KANSAS WILDCAT FAILURES

Rooks County: Continental Oil Co. 1 Choquette, NW NW NW 24-9s-20w, dry, TD 3,867 ft., Heebner 3,385 ft., Lansing-Kansas City 3,424 ft., conglomerate 3,700 ft., Arbuckle 3,828 ft.

Lowell Drilling et al 1 Radke, SW SW NE 12-8s-20w, dry, TD 3,524 ft., anhydrite 1,520 ft., Lansing-Kansas City 3,229 ft., Basal Kansas City 3,449 ft., Arbuckle 3,486 ft.

PERMIAN BASIN

Crane County Wildcat To Drill to Ellenburger

MIDLAND.—Gulf Oil Corp. 1-E-A Hattie Connell, north central Crane County wildcat that has shown for possible production in the Silurian, apparently had only a thin pay section. A drill-stem test from 8,349-95 ft. brought gas to the surface in 6 minutes, and oil in 30 minutes. It cleaned itself in 36 minutes and turned into tanks, flowing 99 bbl. of oil the first 66 minutes, and 89 bbl. of oil the next hour. Operators then drilled to 8,425 ft., and a 90-minute test made with packer at 8,395 ft. Recovery was 50 ft. of drilling mud and some 1,800 ft. of salt water. Drilling was to continue to the Ellenburger. Location of the well is in the NW SW Section 26, Block 22, PSL.

Gulf Oil Corp. 101-E Waddell, ½-mile north extension to Ellenburger production in the University Waddell field, flowed 255 bbl. of clean oil into storage in 6 hours, following acid treatment. Total depth is 10,835 ft., with casing set to 10,707 ft. After treatment and a 50-bbl. oil load, gas came to the surface in 25 minutes. It kicked off and flowed when the oil load was swabbed and was allowed to clean into pits for 30 minutes. The oil contained 4 bbl. of sediment, but no water.

In northeastern Crockett County, Humble Oil & Refining Co.'s second test, the 2 Mrs. Grady Mitcham, in the new Childress Ellenburger field, was dry in the Ellenburger from 8,188-8,249 ft., but operators were drilling ahead below 8,281 ft. to test the entire section. A drill-stem test at 8,188-8,249 ft., open 24 minutes, recovered 60 ft. of drilling mud, with no shows. Location is ½ mile west of the 1 Mitcham, discovery well. Meanwhile Humble's other offset tests were drilling ahead. The 1 Ethel Childress, northeast offset, was drilling below 8,991 ft. in the Ellenburger, with no shows reported. The 1 P. L. Childress, 2½ miles south and approximately 1 mile east of the discovery, was drilling in shale below 6,975 ft.

In the new Midway Lane field of north Crockett County, Sinclair-Prairie Oil Co. and Atlantic Refining Co.'s third Ellenburger producer upheld the flush production of the discovery, the 1-66 University, and its north offset, the 2-66 University. The new well is the 3-66 University, a west offset in Section 30, Block 46, University Lands. Bottomed at 7,635 ft., it flowed oil from open hole at 7,605-35 ft., making slightly better than 142 bbl. of oil the first 3 hours, and 136.7 bbl. the last 3 hours of a 6-hour test. Daily potential was calculated at 1,093.6 bbl. of 45.2°-gravity oil. Gas-oil ratio was 955 cu. ft. The same interests' east offset was drilling below 8,000 ft. on last report.

In Andrews County, Magnolia Petroleum Co. 5-DD-B E. P. Cowden, Section 4, Block A-55, PSL Survey, extended Ellenburger production ¼ mile south, in the north portion of the Dollar Hide area, flowing better than 117 bbl. of oil the last 2 hours of a drill-stem test. The section tested was between 10,094-10,124 ft. A 1,000-ft. water blanket and ⅝-in. bottom-hole choke was used. Gas came to the surface in 26 minutes, with water cushion following immediately; drilling mud in 32 minutes, and oil at the end of 33 minutes. It cleaned into pits for 10 minutes before being turned into storage. Gas-oil ratio was 513 cu. ft. Magnolia's 6-DD-B Cowden, another location south in the same section, was drilling below 8,738 ft.

A third Ellenburger attempt in the Jameson Strawn field of Coke County was dry, with only gas in the top of the formation and sulfur water in the bottom. Sun Oil Co. 1 J. S. Walker was carried to 7,170 ft., after topping the Ellenburger at 7,011 ft., on an elevation of 2,032 ft. It was plugged back to 6,475 ft., and casing was to be set at 6,150 ft. for an attempt at completion in the field's regular pay. Location of the failure, Sun 1 J. S. Walker, in Section 326, Block 1-A, H&TC Survey, and south of the new field, in which there are 10 completed producers.

New exploration work in West Texas included Gulf Oil Corp. 125-E Keystone, a proposed 11,000-ft. Ellenburger test 3¼ miles southeast of production in the Keystone Ellenburger field of Winkler County. Location is 3½ miles northwest of Magnolia Petroleum Co. 1 R. A. Wheeler, which is drilling below 11,583 ft. in dolomite thought to be the Ellenburger. Phillips Pe-

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troleum Co. 1-T University, 1½ miles south and ¼ mile west of the Shafter Lake Devonian discovery, Andrews County, is a Devonian test, contracted to 9,500 ft. In northwestern Andrews, Union Oil Co. 1-A J. D. Biles will be a 1-mile north outpost to the Union field. According to reports, if the regular pay around 7,500 ft. is dry, it may be carried to 8,500 ft. to explore the Devonian.

New locations in West Texas totaled 62 for the week, including 6 wildcats. By counties, field starts were: Hockley 9, Andrews 6, Crockett 5, Winkler 5, Crane 4, Ector 4, Pecos 4, Scurry 4, Cochran 3, Coke 3, Gaines 2, Howard 2, Ward 2, and 1 each in Dawson, Glasscock and Reeves counties. Wildcat locations were 1 each in Gaines, Garza, Nolan, Pecos and Reeves counties.

Field oil-well completions totaled 48. These were: Andector 2, Adair 3, Garza 6, Halley 1, Howard-Glasscock 1, Jordan 1, Keystone Colby 1, Lehn-Apco 1, Levelland 5, Lancaster Hill 1, McCamey 1, Midway Lane 1, Orla 1, Penwell 2, Robertson 1, Sharon Ridge 4, Slaughter 4, Sand Hills McKnight 1, Toborg 4, TXL Clearfork 1, TXL Devonian 1, TXL Ellenburger 1, Waddell 1, Wasson 2, Wheeler Devonian 1.

WEST TEXAS SUCCESSFUL WILDCATS

Crockett County: Continental Oil Co. 1-S University A-8, Sec. 8, Blk. 47, University Lands, 5 mi. S Barnhart pool, pumped 17 bbl. 33°-gravity oil a day, San Andres pay 2,130 ft., TD 2,200 ft., elev. 2,690 ft.

Reeves County: Texzona Producing Co. et al 1 Tunstill Bros., Sec. 14, Blk. 56, T&P Sur., 6 mi. NE Orla, flowed 71 bbl. 42°-gravity oil a day, 9/64-in. choke, Delaware sand 3,268 ft., TD 3,308 ft., GOR 610 cu. ft., casing pressure 700 psi., tubing pressure 150 psi., discovery of Orla pool.

WEST TEXAS WILDCAT FAILURES

Andrews County: Magnolia Petroleum Co. 1 E. C. Nix, Sec. 18, Blk. A-47, PSL Sur., 2½ mi. SE Fullerton South field, dry, TD 7,548 ft., Yates 2,910 ft., Glorietta 5,860 ft., Tubb 6,870 ft., elev. 3,265 ft.

Cochran County: Gulf Oil Corp. 7-E Wristen Bros., Sec. 17, Blk. B-28, PSL Sur., 6 mi. NE Grand Falls, dry, TD 8,345 ft., Simpson 6,620 ft., Ellenburger 8,135 ft., elev. 2,483 ft.

Crockett County: T. V. Criswell 1 J. F. Scull, Sec. 7, Blk. 1, GC&SF Sur., 4 mi. SE Olson field, dry, TD 1,941 ft., show of gas in Yates 890-900 ft., show of oil 1,660 ft., estimated 2 bbl. oil a day at 1,650-1,838 ft.

Pecos County: N. G. Penrose et al 1 Cordova Union, Sec. 91, Blk. 11, H&GN Sur., 7 mi. NW Girvin, dry, TD 4,940 ft., Yates 1,050 ft., San Andres 2,050 ft., Clear Fork 3,000 ft., base Permian 4,775 ft., Ellenburger 4,860 ft., elev. 2,341 ft.

SOUTHEAST NEW MEXICO

HOBBS.—Amerada Petroleum Co. 5 Phillips, NE NE 1-20s-36e, Ellenburger test in the Monument field of Lea County, flowed at the rate of 30,000,000 cu. ft. of gas and 25 bbl. of distillate an hour, on a drill-stem test at 9,600-9,700 ft. Drilling continued below 9,953 ft. Amerada's 12,000-ft. test in 25-19s-35e, was drilling ahead below 9,026 ft. in limestone.

Gulf Oil Corp. 6 C. E. Lamunyon, a wildcat near scattered production in 28-23s-37e, took a drill-stem test between 3,842-4,003 ft. open 1 hour and 15 minutes; gas came to the surface in 18 minutes and flowed at the rate of 19,000 cu. ft. per day. Operators were drilling ahead below 4,550 ft.

Mid-Continent Petroleum Corp. 1-A Sawyer, 27-9s-36e, was drilling below 7,480 ft. in dolomitic shale and anhydrite with no shows reported. Location is 9 miles southwest of Devonian Oil Co.'s 1 Brown-Federal, small discovery near the state line.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: E. A. Hanson 1 Ason & Fair, NW SW 15-15s-31e, dry, TD 4,643 ft., Yates 2,400 ft., San Andres 3,950 ft., elev. 4,406 ft.

Eddy County: Sam Sanders 1 Edith Riggs, SE NW NE 3-21s-24e, dry, TD 983 ft. in limestone.

Sam Sanders 1 George Riggs, 3-21s-24e, dry, TD 945 ft., slight show of oil 865 ft.

ILLINOIS

Clay City Outpost Sets Casing on Saturation

TULEY & CARTER 1 Mosley, NE NW SE 34-3n-8e, ½ mile north of Clay City Consolidated pool, Clay County, set casing on oil saturation in Rosiclare lime at 2,965-69 ft. Drill-stem test got gas in 3 minutes and flowed clean oil in 41 minutes.

B. M. Heath and Indiana Farm Bureau 1 Austin Heirs, SW SE NW 32-6s-9e, halfway between Storms and Roland pools, White County, set 7-in. casing to test Weinberg at 2,395-2,418 ft. where 45 minute drill-stem test got 300 ft. mud-cut oil.

Clay and Wayne counties accounted for 15 of the state's 27 completions for the week with 6 and 9 apiece. White, Clay, and Edwards counties led the state in drilling permits granted with 6, 5, and 4 each; accounting for 15 of the state's 26.

ILLINOIS SUCCESSFUL WILDCAT

Franklin County: V-T Drilling Co. et al 1 Kirk Heirs, SE SE SE 15-7s-4e, IPP 100 bbl. daily, total depth 3,132 ft., 70 qt. at 3,111-27 ft., Aux Vases pay at 3,108-17 ft.

ILLINOIS WILDCAT FAILURES

Christian County: Braden 1 La Charite, NE NW SW 1-12n-1e, dry, total depth 1,622 ft.

Clinton County: Winn 1 Swagler, NE SW NW 10-2n-1w, dry, total depth 1,466 ft.

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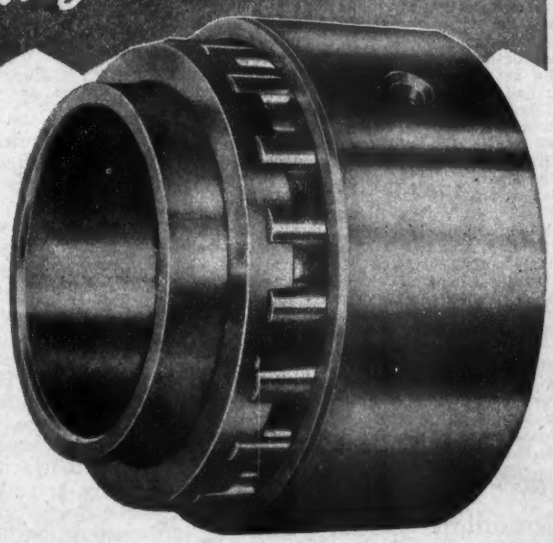

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Crawford County: Smith 1 Osborne, NE NE SW 4-5n-13w, dry, total 2,286 ft.
Franklin County: Lewis & Rock Island 1-A Old Ben Coal Campbell, SE SE NW 16-5s-2e, dry total depth 2,498 ft.
Hamilton County: Meyer 1 Lankford, SE NW SE 31-4s-7e, dry, total depth 3,581 ft.
Shelby County: H. Miller 1 M. E. Miller, SW SE SW 7-9n-4e, dry, total depth 1,816 ft.
White County: Tregar 1 Higginson, NE SE NW 1s-4s-10e, dry, total depth 3,264 ft.
McBride 1 Wasem, SW SE NE 23-7s-10e, dry, total depth 2,973 ft.

CALIFORNIA

New Schist Discovery In Mountain View Area

LOS ANGELES.—Pacific Western Oil Corp. apparently has made a discovery of some sort at its 53 P. H. Greer, in 9-31s-29e, exploratory venture in the Mountain View area of Kern County. No official details of the discovery have been released as yet, but it is reported that the well flowed a stream of clean oil during a 25-minute drill-stem test at 7,145-7,270 ft., the latter being total depth.

When the formation tester was closed and an effort made to pull the packer loose, the drill pipe parted and Pacific Western will now have to complete a fishing job before further tests can be made, and the well completed.

The upper 23 ft. of the zone tested is believed to be sand, while the remaining 102 ft. is hard fractured schist. If this proves to be the case, and the well is successfully completed, the entire schist zone of the Mountain View area will be open for re-examination. Western Gulf Oil Corp. originally discovered schist production in the area early this year, with its 1 DiGiorgio in 10-31s-29e, but subsequent wells have not obtained commercial schist production.

It may be that the schist zone in that area will be extremely spotty, as it is in the Wilmington field. If this is the case, good production will probably be obtained, but the percentage of dry holes among wells drilled to the schist will be high.

Two of the three wells now below 5,000 ft. and headed for the new deep zone in the Signal Hill field have run into trouble. First to encounter difficulty was General Petroleum Co. 4 LPC in 29-4s-12w, which has twisted off drill pipe at 9,294 ft. Shell Oil Co., Inc., 49-A Alamitos, in the same section, is reported to have been halted by lost circulation at 5,522 ft. Well 49-A was started after lost circulation in well 49 Alamitos had forced its abandonment. The third well, Pacific Western 1 Hilton Stanton in 29-4s-12w, meanwhile continues to drill ahead below 8,025 ft.

The Texas Co. has staked location for a follow up well to its discovery, 1 Lombardi in 27-22s-10e, which was completed last week as the first commercial oil producer in Monterey County. The new test is 1 Rosenberg and location is SW SE NW 27-22s-10e.

Canadian Crude Output Shows August Increase

OTTAWA. — Crude-oil production from all Canadian fields in August was 645,589 bbl., an increase of 22,302 bbl. over the same month in 1946.

Among the provinces, the most significant increase was in Saskatchewan. Production in that province for the 8 months of 1947 was 267,444 bbl., as compared to 57,368 bbl. in the 1946 period. New Brunswick was down from 19,285 to 16,235 bbl.; Ontario increased from 80,111 to 80,426 bbl.; Alberta declined from 4,847,600 to 4,335,142 bbl. and the Northwest Territories were up from 124,029 to 164,185 bbl.

Heaviest Agenda in A.P.I. History Covered

(Continued from page 40)

Pew, F. M. Porter, and Frank O. Prior.

The committee reported that the Supreme Court decision in the California case is a serious threat to the dual system of sovereignty which is a fundamental principle of our constitutional form of government, and that if Congress failed to nullify the effect of that decision, the sovereignty of every state in the Union would remain in jeopardy.

The committee felt it was important that Congress not accept the Supreme Court's novel doctrine that the federal Government, because of its responsibility to protect the country and conduct its relations with other nations, can appropriate property without compensation, the title of a state or an individual to which is undisputed.

In view of this, it was suggested that resolutions now pending in Congress should be amended so that Congress would renounce and disclaim any federal Government right, title, interest, or claim to the lands and resources beneath the navigable waters and marginal seas extending seaward to the outer edge of the Continental Shelf. Title should be quitclaimed to the adjacent states, the federal Government reserving its present powers to regulate navigation and commerce in navigable waters.

In addition, to prevent clouds on the titles of states and individuals, Congress should specifically disclaim any right, title or interest of the federal Government in the uplands, or the resources therein, which are owned by the several states, or privately owned. This was felt essential, because the principles on which the California case was decided were so broad that property anywhere in the United States could be claimed on the same grounds—namely, the rights and responsibilities of the federal Government with respect to national defense and conduct of relations with other nations.

As usual, the work done by the numerous committees and subcommittees probably constituted, in total, the greatest direct value the industry will gain from the Institute's annual meeting. With approximately 212 committee and subcommittee meetings scheduled on the formal agenda, hundreds of specific operating problems were either solved, or measures started which will result in their solution or alleviation.

Some of these meetings started as early as Wednesday of the week before the general program; some of them were still in session on the last day of the general sessions. In total, they were attended and participated in by probably 2,000 engineers, scientists, technologists, manufacturers, and operating men.

Equipment Suppliers to Cooperate in Census

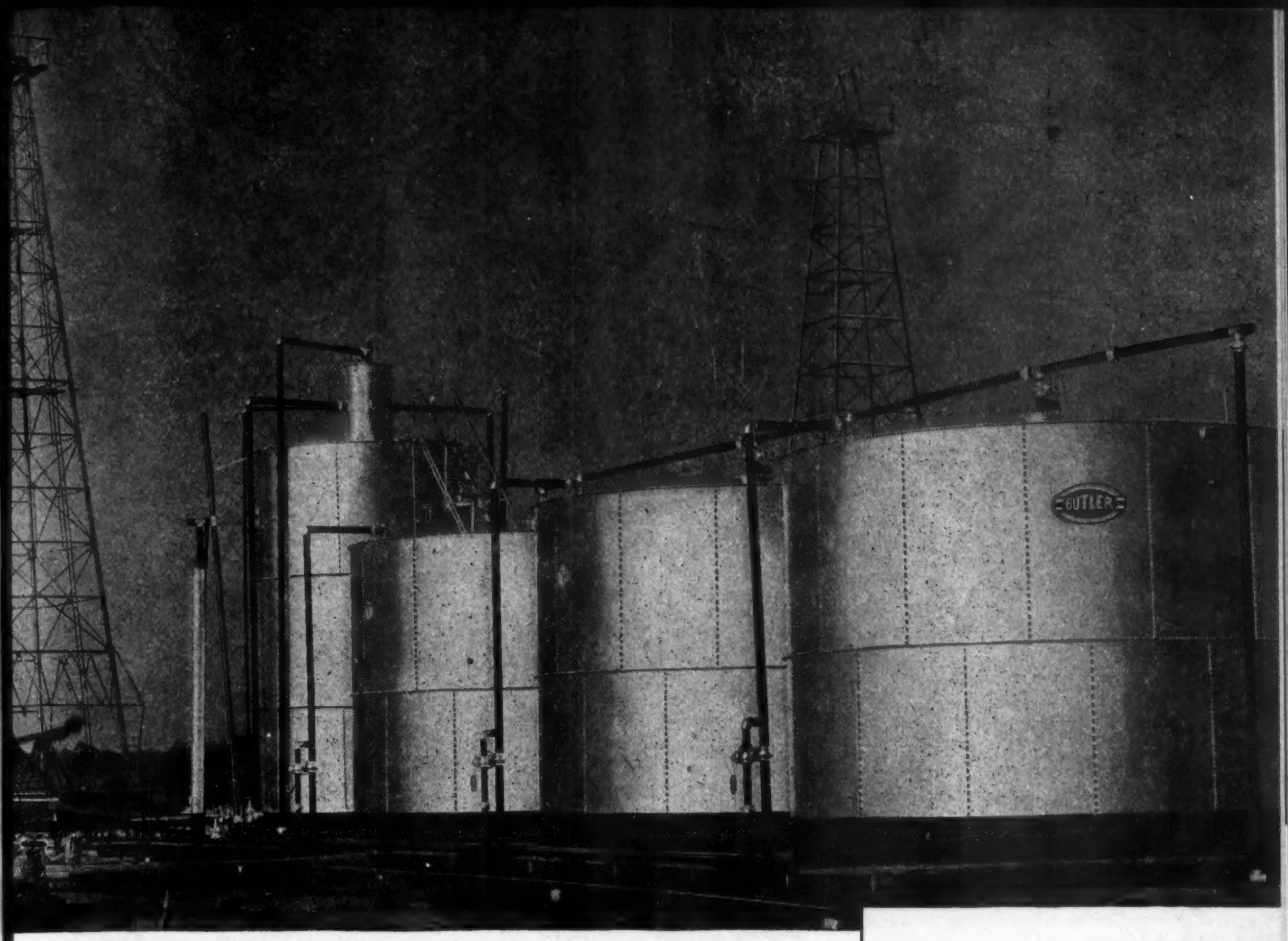
Improvements in the data published on petroleum equipment manufacturers by the Census Bureau of the Department of Commerce are expected to result from conferences held in Chicago last week between M. Gretton, of the bureau, and the Petroleum Equipment Supplier's Association.

Furnishing the information to the bureau is mandatory upon the manufacturers, under the law, but the bureau also is required to keep individual reports confidential, publishing only summaries for all companies, and, where only one or two companies are involved, grouping the information in some generally similar class involving more companies.

The census for 1947 will be the first since 1939, because of the war, but henceforth it will be a regular 5-year interval report, supplemented by annual reports on special subjects. As published, the survey will embody classifications recommended by the equipment manufacturers.

LEGAL

CALL FOR BIDS. To sell royalty crude oil accruing to the United States. Sealed bids, in duplicate, will be received in the office of the Director of the Geological Survey, Room 5244 Federal Works Agency Building, Washington 25, D.C., on or before noon, December 4, 1947, and publicly opened at 2:00 p.m., on that day, for the sale of certain royalty crude oil accruing to the United States from Federal lands in the Cat Creek field, Montana; the La Barge, Rock Creek, and South Elk Basin fields, Wyoming; and the Elk Basin field, Wyoming and Montana. No bids received after the time fixed herein for submitting bids will be considered. Contracts for the royalty oil will be for a term of 3 years beginning the first day of the calendar month following execution by the Secretary of the Interior. The monthly royalty oil accruals offered for sale under seven items are approximately as follows: 3,200 barrels from the Cat Creek field; 4,200 barrels from the La Barge field, 1,600 barrels from the Rock Creek field, 3,000 barrels from the South Elk Basin field; and 45,000 barrels from the Elk Basin field. Specifications on the quantities of crude oil offered for sale, the form of bids, the form of contract, and the conditions with respect to bond requirements, deliveries, volume measurements, gravity determinations, and other details relating to the call for bids may be obtained from the Director, Geological Survey, U.S. Department of the Interior, Washington 25, D.C., or the Oil and Gas Supervisor, U.S. Geological Survey, P.O. Box 400 (305 Federal Building), Casper, Wyoming. Sealed bids must be submitted to the Director of the Geological Survey, U.S. Department of the Interior, Washington 25, D.C., pursuant to the specifications, the envelope to be marked plainly "Bid on Royalty Oil, not to be opened before noon, December 4, 1947." C. Girard Davidson, Acting Secretary of the Interior.



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El Dorado, Ark.

UNION TANK & SUPPLY CO.
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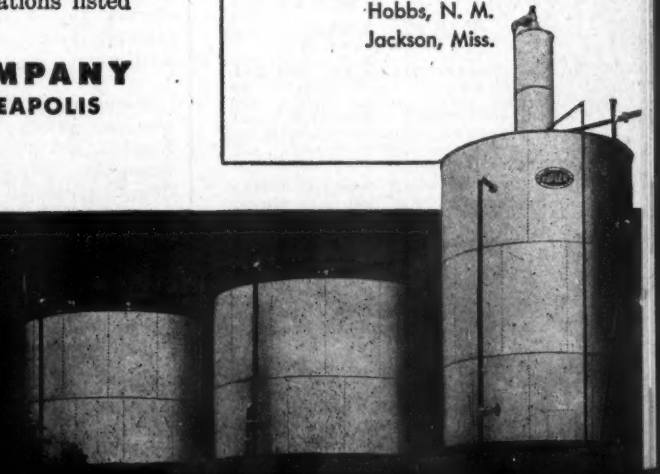
Lafayette, La.
Great Bend, Kans.
Tulsa, Oklahoma City, Okla.
Hobbs, N. M.
Jackson, Miss.



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Among the Drilling Contractors

Can-Tex Brings in Important Discovery

Can-Tex Drilling Co. is contractor on an important discovery well on southern Alberta plains, Canada, the Cal-Imperial-Bantry 11-2-18-13, located in SE, LSD 1, 2-18-13w4. Location is 100 miles east and south of Calgary and 10 miles southwest of South Princess field. On drill-stem test of basal Cretaceous at 3,249-59 ft., flow of oil reached surface in 59 minutes and well was allowed to flow water-free 24°-gravity oil for 40 minutes at unreported rate. Can-Tex also has contract for a new wildcat in southeast Alberta to test all possible pays in Madison lime. Well is Juno-Province 54-18-10-12, NE LSD 6, ½ mile south of Juno. Location is 24 miles northeast of Taber oil fields.

Olson Drills Deep Shell Distillate Well

Olson Drilling Co., Tulsa, is contractor for Shell Oil Co., Inc., 1 Joe Walters, C NE SW 14-10n-21w, wildcat 4 miles south of Elk City, Beckham County, Oklahoma, which has opened gas-distillate production in "big trough" of Anadarko basin. On test, well made 30,000 M.c.f. of gas per day and 15 bbl. of 61°-gravity distillate per hour through $\frac{1}{4}$-in. tubing choke.

F. Beard, Mount Carmel, Ill., is drilling a cable-tool wildcat for A. B. Barrow in Martin County, Indiana, the 1 Webb Crane, SW SW SW 4-3n-4w.

Severns Drilling Co., Los Angeles, is drilling British-American Oil Producing Co. 1 Village Community, Alondra area, Los Angeles County, California.

Herndon Drilling Co., Tulsa, has received permit to drill its 1 R. M. Randall, 330 ft. from north and west lines, SE NE NE 1-9s-9e, Gallatin County, Illinois.

Commonwealth Drilling Co., Calgary, Alta., is starting Earlie 1-11-36, a wildcat for Husky Oil & Refining, Ltd., and Continental Oil Co. in Lloydminster region of Canada. Location is NE LSD 11, 36-48-3w4, 2 miles east of Earlie and 14 miles southwest of Lloydminster Town.

Tine Gaiser is drilling a Texas Co. well on its R. H. Anderson lease, Cymric field, California.

Ford Henry, Holland, Mich., is contractor for James J. McGerry 1 W. A. Baumgarten, NE NE SE 19-3n-15w, a wildcat, Allegan County, Michigan.

R. H. Crow Drilling Co., Shreveport, has work under way at Douglas Whitaker and S. G. Dildy 1 Quillin heirs, NE SE NE 10-17s-27w, Miller County, Arkansas. Location is an outpost on the southwest side of Fouke field, and contract depth is 5,000 ft.

Gutowsky Brothers Drilling Co., Oklahoma City, and Ivan Otstot have spudded 1 Frank Martin, NE NW SW 24-13n-1w, wildcat west of Jones district, Oklahoma County, Oklahoma. Contract is for 6,100 ft. or Wilcox.

Union Drilling Co., Mount Pleasant, will drill Don Rayburn 1 Harold J. McFarland, SE NE NW 34-20n-3e, a wildcat in Arenac County, Michigan.

Loffland Brothers Co., Tulsa, has contract for Amerada Petroleum Corp. 1 Cal-Pack, gas test in Byron area, San Joaquin County, California. Same company has spudded Pacific Western 24 Waechter, wildcat, Fresno County, California.

J. I. Roberts Drilling Co., Shreveport, is drilling C. H. Murphy, Jr., 1 Pipes, SE NW 19-17n-5w, a Travis Peak test about 2½ miles north and slightly east of Sugar Creek field, and 7 miles south of Arcadia, in Bienville Parish, North Louisiana.

Surran Drilling Co. has contract for W. M. Dunn 1 Jim Boy, NE NE SW 36-11n-10e, wildcat southeast of Okemah, Pontotoc County, Oklahoma. Contract is for Cromwell expected around 3,300 ft.

W. C. Taggart, Big Rapids, Mich., has contract for two new Michigan wildcats. Michigan Consolidated Gas Co. 1 Carpenter-Moiles-Lake Properties, NW SE NW 35-15n-7w, is in Mecosta County, and same operator's 1 Stirling Bank, C W½ 36-15n-12w, is in Newaygo County.

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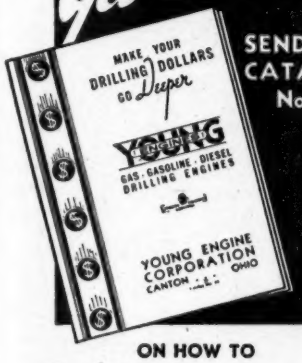

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Sherin & Son, Oklahoma City, are contractors for C. L. McMahon, Inc., 1 Maryott, NE NE SE 6-17n-1e, wildcat near Cimarron River, west of Coyle pool, Payne County, Oklahoma. Well is on block of 1,500 acres and is scheduled to test second Wilcox sand at 5,600 ft.

Perry, Busk & Ormiston, Grand Rapids, will drill a wildcat, Augie Busk 1 Harvey Westbrook, SE NE NW 28-11n-12w, Newaygo County, Michigan.

Keating Drilling Co., Tulsa, is moving in for Cities Service Oil Co. 4 Bayley, SE NW NE 24-7s-9e, Gallatin County, Illinois.

Fowler Drilling Co., Long Beach, is drilling Warren L. Meeker 1 Gerry, Wilmington field, California.

Crescent Drilling Co., Monroe, La., has brought in a producer at its 1 Minton, NW NW 15-6n-8e, east side of Mallalieu field, Lincoln County, Mississippi. Well made 508 bbl. of oil in 24 hours on initial test of pay at 10,503-30 ft.

Buaas Drilling Corp., Bakersfield, Calif., is redrilling Western Gulf Oil Co. 6 USL-G, Oak Canyon field, Los Angeles County, California. Buaas is also completing Standard Oil Co. of California well 366-19-R, Elk Hills Naval Reserve, California.

Ed Eads is drilling Joseph B. Graham 4 W. L. Gladish, 144 ft. from south and 632 ft. from west lines, SW SW NW 31-1n-8w, Pike County, Indiana.

Delta Drilling Co., Evansville, will drill a wildcat for Joe Reznik which is tentatively scheduled for 10-L-23, Webster County, Kentucky. Location is 2½ miles west of Slaughters pool and will be 1 Sallie Brown.

Coats-Harrell Drilling Co. has contract for F. R. Jackson 1 First National Bank of Quitman, Jane Duncan Survey, Wood County, East Texas. Location of the wildcat is 2 miles northeast of Norman Paul field. It will test the Woodbine.

Gene Reid Drilling, Inc., Bakersfield, has contract for Gilmour Associates, Ltd., well, in townlot area, Huntington Beach field, California. Reid also has contract for two Kern River field wells for C. E. Beatty.

Dave Morgan Drilling Co., Blackwell, Okla., is starting 1 Barker, SE SE SW 21-18n-1w, near Cimarron River and north of Pleasant Valley field, Payne County, Oklahoma. Test is contracted for Wilcox sand.

Wright Drilling Co., Houston, will drill a 9,000-ft. wildcat north of LaPorte, Harris County, Texas.

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STATISTICS and T

WEEKLY WELL COMPLETIONS . . WEEK ENDED NOVEMBER 15, 1947

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1947				
	Comp.	Oil	Gas	Dry	Footage	1947	1946	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	44	22	0	*22	51,604	1,497	1,395	0	0	0	0	0	3	0	0	2	5
Pennsylvania	75	33	7	†35	122,498	2,695	3,502	0	0	2	1	3	0	0	5	2	7
West Virginia	14	2	8	4	40,816	765	661	1	0.	0	3	4	5	0	31	23	59
Ohio	24	6	8	10	64,559	1,179	1,115	0	0	1	0	1	0	0	6	39	45
Indiana	14	7	2	‡5	24,505	571	325	0	0	0	0	0	22	0	0	36	58
Kentucky	23	6	7	10	37,539	643	414	0	0	0	0	0	8	0	0	33	41
Illinois	37	16	0	21	98,542	1,829	2,039	1	0	0	7	8	59	0	1	311	371
Michigan	27	7	5	15	62,432	808	709	0	0	0	11	11	9	0	11	216	236
Kansas	66	36	15	§15	202,848	2,379	1,755	0	0	0	2	2	36	0	13	308	357
Neb., Mo., Iowa	0	0	0	0	0	5	18	0	0	0	0	0	0	0	0	5	5
Oklahoma	53	28	5	20	157,066	3,548	2,612	1	0	0	5	6	102	8	19	595	724
Texas	195	121	14	60	782,670	8,066	6,895	5	1	0	37	43	258	53	75	1,249	1,635
North Central (Dist. 7-B & 9)	48	23	3	22	97,196	2,538	2,426	0	0	0	11	11	71	1	11	421	504
West (Dist. 7-C & 8)	56	50	0	6	236,933	1,966	1,540	2	0	0	5	7	39	0	3	148	190
Panhandle (Dist. 10)	12	7	5	0	37,579	411	280	0	0	0	0	0	1	0	2	10	13
Eastern (Dist. 5 & 6)	13	8	3	2	75,230	491	623	0	0	0	2	2	9	2	5	104	120
Gulf Coast (Dist. 3)	33	19	0	14	205,579	1,383	1,514	0	1	0	8	9	62	37	32	255	386
Southwest (Dist. 1, 2 & 4)	33	14	3	16	130,153	1,277	512	3	0	0	11	14	76	13	22	311	422
Louisiana	48	28	4	16	229,236	1,389	1,228	1	2	0	6	9	37	23	9	182	251
Northern	27	18	4	5	79,787	824	698	0	1	0	2	3	3	2	3	112	120
Southern	21	10	0	11	149,449	565	530	1	1	0	4	6	34	21	6	70	131
Arkansas	0	0	0	0	0	274	160	0	0	0	0	0	2	0	0	51	53
Mississippi	12	7	0	5	95,460	431	221	0	0	0	2	2	2	0	1	82	85
Southeastern States	1	0	0	1	5,103	55	38	0	0	0	1	1	0	0	0	47	47
Montana	7	3	2	2	10,409	260	281	0	0	0	1	1	6	0	7	23	36
Wyoming	4	4	0	0	16,628	223	148	0	0	0	0	0	12	0	6	38	56
Colorado-Utah	9	6	0	3	46,043	182	141	0	0	0	2	2	2	0	3	41	46
New Mexico	13	7	3	3	44,565	465	355	0	0	0	3	3	6	0	1	37	44
California	39	34	1	4	152,597	1,755	1,336	1	0	0	3	4	43	0	8	246	297
Total United States	705	373	81	251	2,245,120	29,019	25,348	10	3	3	84	100	612	84	196	3,566	4,458
Total previous week	765	360	87	317	2,555,609	28,314	24,718	15	2	6	104	127	602	81	193	3,482	4,358
Total November 16, 1946	630	331	94	205	2,067,069			6	0	5	75	86	499	39	112	3,043	3,693

Service wells included: *22, †31, ‡1, §2.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
18-18.9	$1.67	....	....	...
19-19.9	1.69	....	....	....
20-20.9	1.71	$1.75	....	$1.62
21-21.9	1.73	1.77	....	1.64
22-22.9	1.77	1.79	....	1.66
23-23.9	1.80	1.81	....	1.68
24-24.9	1.84	1.83	$2.06	1.70
25-25.9	1.88	1.85	2.08	1.72
26-26.9	1.91	1.87	2.10	1.74
27-27.9	1.95	1.89	2.12	1.76
28-28.9	1.99	1.91	2.14	1.78
29-29.9	2.02	1.93	2.16	1.80
30-30.9	2.06	1.95	2.18	1.82
31-31.9	2.09	1.97	2.20	1.84
32-32.9	2.12	1.99	2.22	1.86
33-33.9	....	2.01	2.24	1.88
34-34.9	....	2.03	2.26	1.90
35-35.9	....	2.05	2.28	1.92
36-36.9	....	2.07	2.30	1.94
37-37.9	....	2.09	2.32	1.96
38-38.9	....	2.11	2.34	1.98
39-39.9	....	2.13	2.36	2.00
40 and above	....	2.15	2.38	2.02

*Standard Oil Co. of California posting. †For crude from Daboval, El Campo, and Sandy Point. ‡Includes Lea County, New Mexico.

A.P.I. REFINERY REPORT, WEEK ENDED NOVEMBER 8

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	759	1,948	171	1,079	1,528	17,962	8,842	19,184	9,158
Appalachian:									
District 1	100	343	56	71	96	2,056	469	752	441
District 2	65	236	31	57	117	877	154	256	265
Ind., Ill., Ky.	842	3,181	395	953	1,160	14,044	3,109	8,990	5,622
Okla., Kans., Mo.	425	1,500	140	513	488	6,502	1,304	3,873	1,691
Inland Texas	262	1,024	137	158	407	2,628	672	611	742
Texas Gulf Coast	1,286	3,839	676	1,635	1,811	14,657	4,038	10,289	7,591
La. Gulf Coast	388	1,235	380	595	494	5,316	2,231	3,529	2,890
N. La. & Ark.	76	187	57	79	110	1,408	467	549	237
Rocky Mountain:									
New Mexico	12	41	..	12	21	77	25	22	33
Other Rocky Mt.	128	436	13	131	240	1,374	157	920	630
California	846	2,300	33	973	2,300	15,106	1,125	14,383	27,872
November 8, 1947	5,189	16,270	2,089	6,256	8,772	82,007	22,593	63,358	57,172
November 1, 1947	5,224	15,926	1,903	6,793	8,364	82,092	22,566	62,749	57,259
November 9, 1946	4,704	15,239	1,884	5,451	7,565	86,991	22,052	69,389	60,929

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 223,703,000 bbl. as of November 8—down 1,326,000 bbl. One year ago 221,302,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas	$2.15
Kettleman Hills, California*	2.14
Beauregard Parish	2.10
Illinois Basin	2.27
Pecos County, Texas (Yates)	1.85
Bradford, Pennsylvania	4.50
Eastern Ill. and Western Ind.†	2.27
Tomball, Texas Gulf Coast	2.33

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

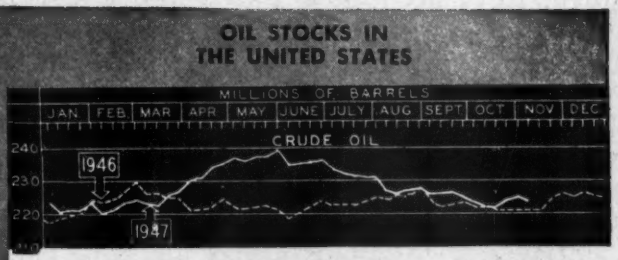
	Nov. 15 crude oil	B. of M. Nov. demand	Nov. 8 crude oil
Alabama	1,200	1,200	1,300
Arkansas	85,000	82,000	84,300
California	926,500	930,000	925,200
Colorado	48,530	45,000	48,020
Eastern	65,000	64,200	67,990
Florida	750	1,000	950
Illinois	175,900	200,000	178,800
Indiana	18,100	18,000	18,300
Kansas	298,650	306,000	281,950
Kentucky	26,300	26,000	25,700
Louisiana	459,000	450,000	458,750
North Louisiana	117,750	.....	117,500
South Louisiana	341,250	.....	341,250
Michigan	43,520	47,000	50,505
Mississippi	106,765	100,000	107,915
Montana	24,370	24,000	23,790
Nebraska	550	600	550
New Mexico	117,175	115,000	117,175
Oklahoma	411,300	405,000	409,350
Texas	2,370,925	2,320,000	2,370,925
Dist. 1 (Southwest)	24,425	.....	24,425
Dist. 2 (Southwest)	162,150	.....	162,150
Dist. 4 (Southwest)	259,475	.....	259,475
Dist. 3 (Gulf Coast)	491,575	.....	491,575
Dist. 5 (Eastern)	41,125	.....	41,125
Dist. 6 (Eastern)	118,175	.....	118,175
East Texas Field	318,575	.....	318,575
Dist. 7-C (West)	40,750	.....	40,750
Dist. 8 (West)	645,825	.....	645,825
Dist. 7-B (W. Central)	43,600	.....	43,600
Dist. 9 (N. Central)	136,075	.....	136,075
Dist. 10 (Panhandle)	89,175	.....	89,175
Wyoming	123,510	125,000	120,920
Total United States	*5,303,045	5,260,000	5,292,390
Change from prev. wk., up	10,655		

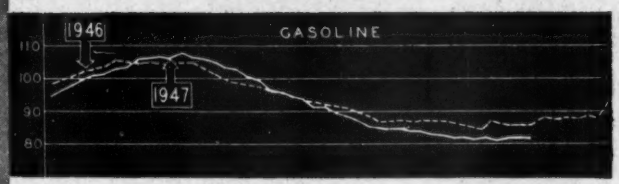
Total production January 1-November 15 †1,611,714,980 bbl.

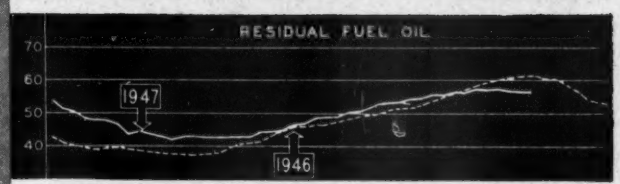
Same period last year (crude plus cond.) 1,515,432,634 bbl.

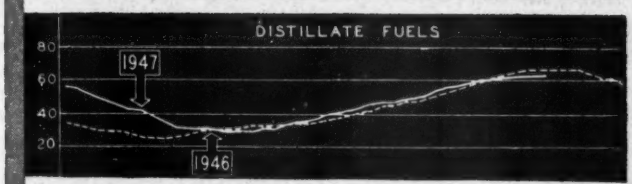
*Not incl. 42,150 bbl. condensate. †Incl. 10,661,100 bbl. condensate.

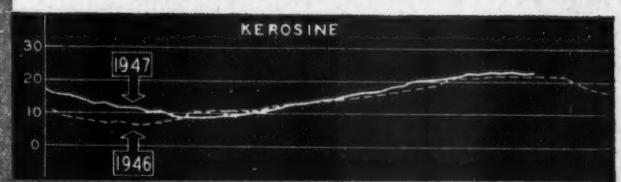
OIL STOCKS IN THE UNITED STATES



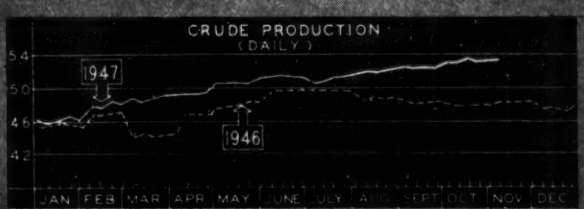


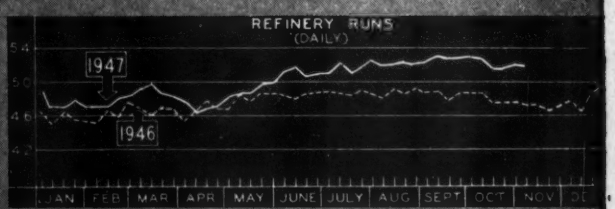




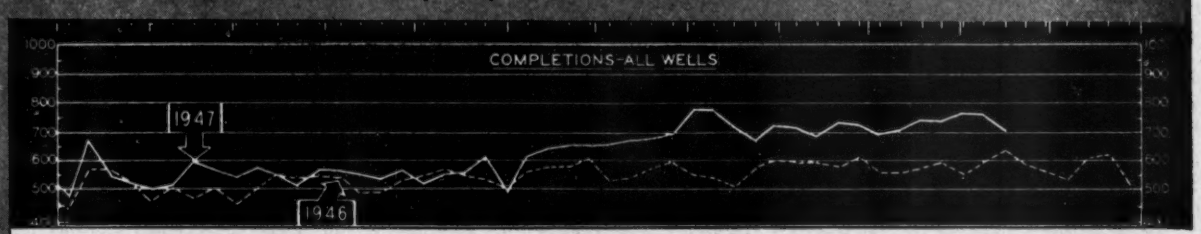


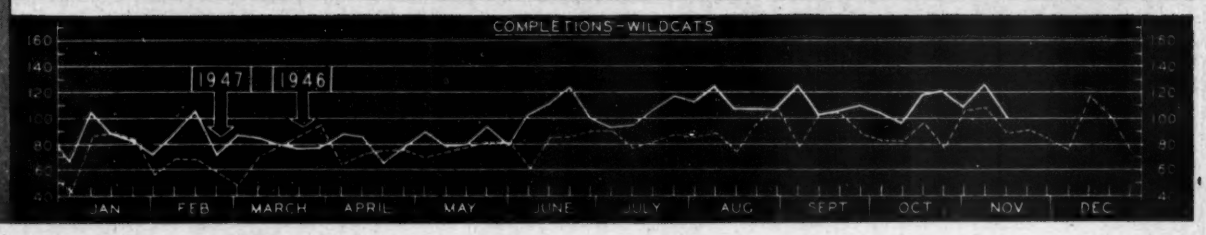
DAILY OPERATIONS





Solid line charts weekly completions, service wells in Eastern area included.





TAPECOAT Those "Weak Links"

In Your Fight Against Corrosion...

It doesn't make sense to protect pipe with quality coatings and then use makeshift protection on pipe joints. After all, protection is only as good as its weakest joint.

That's why more and more distribution engineers are standardizing on TAPECOAT—the dependable wrapping in tape form that provides pipe joint protection equivalent to the mill coating on the pipe.

TAPECOAT is easy to apply. You simply spiral wrap the joint, starting and ending on the mill coated pipe, thus making the protection on the joint equal to the coating on the pipe. It will pay you to guard against those "weak links" with TAPECOAT.

Write for complete details.

The TAPECOAT Company

1523 LYONS STREET EVANSTON, ILLINOIS

MARKETS

PENNSYLVANIA-GRADE crude in the Kane-to-Butler area was increased 13 cents early this week, and Western Pennsylvania lubricating oils advanced 2 cents. The crude increases brought the price of the Middle District crude up to the same level of the Allegany and Bradford fields, $4.50. The crude price advance of 2 cents increased the bright stocks from 45 to 47 cents per gallon and of neutrals from 43 to 45 cents per gallon.

Following Socony-Vacuum Oil Co., Inc.'s recent announcement "to effect the most equitable distribution" of its products by tightening the control over the flow of these products, several other East Coast suppliers have indicated a possibility of their cutting back on supplies by means of similar allocations. Although Socony-Vacuum's action was the first to touch light fuel oils, Standard Oil Co. (N.J.) has been cutting motor fuel allocations to dealers for the past month or more, and a majority of the East Coast dealers are following a more or less informal quota for distribution.

Tankers Pose Problem

Generally the allocation plan is based on 100 per cent of last year's requirements, plus any additional amounts available. Several suppliers in the East Coast area have indicated that if tanker shortages continue into peak winter months they would probably have to cut light heating oil sales below sales of a year ago.

Despite cooler weather and the fact that the oil refining industry is looking toward an increased production of the middle distillates, the record-breaking demand for motor fuel has continued. In previous years, remarked one supplier, Labor Day could be used as the time that marked the beginning of a decreasing demand for gasoline.

Despite public and governmental concern over fuel shortages this winter the natural resources committee of the Chamber of Commerce of the United States has indicated that "barring strikes and other interruptions, continued capacity operation will be ample to take care of anticipated over-all demands of coal and oil." Max Ball, director of Interior Department's Oil and Gas Division, has predicted spotty shortages with "some cold homes this winter."

Gulf Coast prices remained steady last week with supplies still unavailable. Offers of from ½ cent to 1 cent per gallon above posted prices for kerosine were reported but could not be filled. South Texas lubricating oils were unchanged.

Gasoline Demand Strong

In the Mid-Continent area the cold weather had no appreciable affect in the slackening of gasoline demand, while heavier oils picked up considerably after a previously somewhat sluggish period. Postings for No. 6 continued well above the $2 mark. Generally ¾ to 1 cent was offered for the lighter distillates on the spot market above prevailing market postings, and several shipments were reported to have moved at prices considerably higher than these. Demand was strong for all middle distillates and supply "seemed" growing increasingly tighter, according to one shipper.

The greatly increased number of oil burners that have been sold to replace coal heating for many homes has not yet lent itself to the increased acceleration of demand.

Representative Quotations

Representative spot-market quotations of leading suppliers as of November 17, 1947. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	9-10¼	10.5-10.9* 9.6-10†	9-11¼
Premium gasoline, 78-80 octane	10¼-11	10.2-12	9½-12
42-44 w.w. kerosine	8-9	8.1-8.9	7½-9½
No. 2 straw fuel oil	7½-8½	7.2-8	7-8½
No. 6 residual	$2-2.35	$2.22-2.52	$1.98-2.75

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.65	7.95

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	11-12¼
750 vis., No. 3-4 neutral	13-14½
2,000 No. 5-6 neutral	14½-16

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-31
200 vis. No. 3 neutral, 0-10 pp.	18-19

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	47
180 vis. p.t. neutral	45

CRUDE-SCALE WAX

Mid-Continent

130-133 A.S.T.M. melting point	7½-7¾

EQUIPMENT MEN ... in the News

Axelson Announces Top Personnel Changes

D. F. AXELSON

Axelson Manufacturing Co. announces the retirement and resignation of D. F. Axelson, formerly vice president in charge of manufacturing. Axelson's retirement has resulted in the promotion of R. M. "Bob" Pease, formerly vice president and assistant general manager. Pease is now headquartered at the main plant in Los Angeles. Also promoted is Victor "Vic" Mancuso, formerly works manager, to the position of vice president in charge of manufacturing.

R. M. PEASE

VICTOR MANCUSO

Branch, Reynolds, Dyer Join Jarecki

Jarecki Manufacturing Co., Erie, Pa., announced three appointments to its oil-field supply staff.

Joseph P. Branch has been appointed district manager in South Texas with headquarters at the company's Corpus Christi store. Branch has a background of 20 years in the oil-field supply business and is particularly well known in the Southwest Texas area, where he has been located for the past 12 years.

W. B. Reynolds has been appointed manager of industrial sales for the South Texas area, also with headquarters at Corpus Christi. Reynolds has been engaged in the oil-field supply business for the past 10 years and has been active in the Southwest Texas area since 1943.

Sam T. Dyer has been appointed special sales representative with headquarters at the main office of the company's oil-field supply division, at Houston. Dyer has been active in the oil industry, particularly in the Texas Gulf Coast area, since his graduation from college in 1929, his experience including work in the oil fields as roustabout and roughneck, followed by extensive experience in selling oil-field equipment.

Klopfenstein New Sales Manager

Gerald J. Klopfenstein has been appointed sales manager, meter division of Bowser, Inc., Fort Wayne, Ind. Klopfenstein joined the organization in October 1923, and since that time has served in the inspection, production engineering, drafting, designing, and engineering departments. Prior to his new assignment he was manager of planning and sales engineering. As sales engineer during the past 8 years, he has worked closely with field salesmen and customers on all types of installations.

Customer Service Inaugurated by Fluor

Fluor Corp., Ltd., announces the establishment of a customer service department to handle the servicing of its various products of manufactured equipment. E. L. Bishop, who has been employed by Fluor for 12 years in the manufacturing department, will be in charge of this service for the Mid-Continent area, which will be located in Houston. It is believed that the establishment of such a department to take care of service work, startups, and any operating troubles which might be encountered, will enable Fluor to render a more complete service to its various clients.

Huxtable Joins Fawick

Fawick Airflex Co., Inc., Cleveland, announces appointment of Richard Scott Huxtable as executive vice president and general manager. Huxtable's career in the industrial field thoroughly qualifies him for his new post. Prior to his new appointment, he was assistant to George W. Codrington, vice president and general manager of Cleveland Diesel Engine Division of General Motors Corp.

Mixing Equipment Appoints Southwestern Representative

A. J. EDWARDS

Allan Edwards, Inc., Tulsa, pipeline, refinery, and gasoline - plant equipment engineering firm, has been appointed exclusive representative by Mixing Equipment Co., Inc., Rochester, for the following: Oklahoma, Kansas, Texas Panhandle districts and including Fort Worth and Dallas territory. The organization will handle engineering and sales for the Mixing Equipment Co., lines of portable, turbine-type and side-entering mixers for fluid agitation and mixing.

Principals in the Edwards firm are A. J. (Scotty) Edwards and J. D. Irons. Edwards is widely known in oil circles, having been actively engaged in the oil-field-equipment business for the past 25 years. As vice president of the Tulsa Purchasing Agents Association in 1925 and sales manager of Black, Sivalls & Bryson, Inc., with whom he was associated for 20 years, he has a close relation with the buying and engineering personnel of the petroleum industry. Irons came to the Edwards organization from Stanolind Oil & Gas Co., in West Texas where he served as junior petroleum engineer. He served in the Navy for 33 months as an ordnance specialist after graduating from the University of Tulsa as a petroleum engineer in 1942.

Timken Purchases Rock-Bit Plant

Timken Roller Bearing Co. has purchased the 8-acre site and taken over all construction on the new $150,000 rock-bit plant at Colorado Springs, Colo. The plant was originally scheduled to be built by the Colorado Springs Chamber of Commerce and leased to the company but it was later decided that the company would build the plant.

It was announced simultaneously that Frank M. Givin, general foreman of the company's Mount Vernon plant, was named manager of the new unit. Final construction work, installation of machinery, and getting the plant into production is under the advisory supervision of William A.

Fowler, general manager of the Columbus plants, and is expected to be completed about December 1.

Unibolt Announces Personnel Changes

Thornhill-Craver Co., Houston, manufacturers of Unibolt products, has announced the following personnel changes: Jay Hembree, who has served as salesman for the company in West Texas for the past 2 years, has been transferred to Corpus Christi in a similar capacity. Earl Grissom, former sales representative in the Corpus Christi area, was transferred to Oklahoma last month.

JAY HEMBREE

BILL WALMSLEY

Bill Walmsley is a newcomer to the Unibolt sales staff. Prior to joining the company, Walmsley was a scout for a major oil company in West Texas, where he will continue to operate as Unibolt sales representative with headquarters at Midland.

Jones & Laughlin Publishes New Magazine

Jones & Laughlin Steel Corp. has distributed to its 42,000 employes and 25,000 shareholders the first issue of the corporation's new monthly magazine "Men and Steel." The purpose of the publication is to "bring to the attention of employes and shareholders pertinent facts and the views of the management with respect to the past, current, and future operations of the corporation," Adm. Ben Moreell, president, declares in a foreword.

"Men and Steel" is the first corporation-wide magazine ever published by J. & L., although Otis Works, at Cleveland, has been publishing an internal plant magazine called the "Otis Sheet." "Men and Steel" will replace this as well as several smaller miscellaneous publications that have been put out by different divisions of the corporation.

The magazine is published under the direction of Earl F. Blank, assistant to vice president—personnel and industrial relations of the corporation. Plant editors and their reportorial staff gather and edit the news for the plant sections.

Lindenmuth New Division Manager

H. S. Lindenmuth has been appointed division manager for the northern sales division of Larkin Packer Co., Inc., St. Louis. The northern territory includes the Texas Panhandle, Oklahoma, Kansas, Illinois, Michigan, Kentucky, and Indiana. Lindenmuth will make his headquarters in Wichita, Kans. Lindenmuth joined the Larkin sales organization 13 years ago and has worked the Oklahoma-Kansas area as sales representative during these years.

Unit Rig Names Mid-Continent

Unit Rig & Equipment Co., Tulsa, announces the appointment of Mid-Continent Supply Co., Inc., 42 Broadway, New York City, as exclusive export distributors of its entire line of oil-field equipment.

United Engineers Change Tulsa Office Location

United Engineers, sales and service company for Penetron and Audigage, have recently moved from 625 S. Kenosha in Tulsa to 824 E. Sixth Street. The company will spend $5,000 remodeling its new headquarters and will have 3,500 sq. ft. of floor space after remodeling.

In addition to gamma ray and supersonic thickness measurements, the company does consulting and development work in the fields of electrical and process engineering. B. I. Dikmen, owner, was formerly chief process instrument engineer for Manning, Maxwell & Moore. Dikmen has a master of engineering degree from Yale University; B.S. in electrical engineering from Roberts College, Istanbul, Turkey, and B.A. from Tarsus College, Turkey.

Refinery Engineering Opens Tulsa Office

Refinery Engineering Co. of Chicago, has recently opened a Tulsa office at 24 North Elwood, with T. N. Lumly in charge.

Refinery Engineering has the contract for the modernization of Sunray Oil Corp.'s recently acquired 100-octane plant at Duncan, Okla., which it purchased from War Assets Administration. It is anticipated that the initial operation of this plant will begin by December 1 of this year. Lumly stated that his company is also constructing a shale-oil demonstration plant at Rifle, Colo., for the U. S. Bureau of Mines.

Other projects of the company are additions to three booster stations and construction of one new station for Natural Gas Pipe Line Co. of America in Oklahoma and Kansas. This is part of the 135,000,000-cu.-ft.-per-day expansion program to deliver natural gas to the Chicago area from the Texas Panhandle.

New Road-Test Laboratory For du Pont

A road-test laboratory, to test petroleum chemicals in motor fuels, is being established by E. I. du Pont de Nemours & Co. (Inc.) at El Monte, Calif. Iver Theodore Rosenlund, research engineer, has been named laboratory manager. Complete analysis tests, under actual operating conditions, will be made on oils, diesel fuels, and all types of gasolines, both chemically and physically. Particular emphasis will be put on the various products of the du Pont petroleum chemicals division, especially on tetraethyl lead compounds, which Du Pont will market directly to the oil industry beginning January 1, 1948.

Vapor Recovery Appoints Scotty

A. D. SCOTTY, JR.

Angelo D. Scotty, Jr., has been appointed sales engineer for Vapor Recovery Systems in Houston. He will assist John L. Shaunty, Houston district manager. Scotty is from Houston and a graduate of Rice Institute, where he obtained a degree of B.S.Ch.E. During the war he was a navigator in the U. S. Army Air Corps.

Bridges Joins Wheatley

M. J. "Tiny" Bridges has joined the sales organization of Frank Wheatley Pump & Valve Manufacturers as district sales manager of Texas. Bridges will headquarter in Fort Worth. He was formerly with Midco Valve Co., coming to that firm with 12 years' experience as a representative of Iverson Tool Co.